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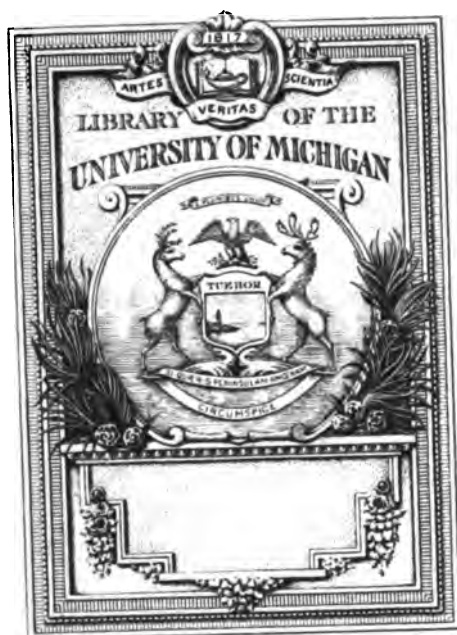
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**REPORT OF THE SECRETARY
OF THE
SMITHSONIAN INSTITUTION**

FOR THE YEAR ENDING JUNE 30

1910



(Publication 2002)

**WASHINGTON
GOVERNMENT PRINTING OFFICE
1910**

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT,
FOR THE YEAR ENDING JUNE 30, 1910.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit a report showing the operations of the Institution during the year ending June 30, 1910, including the work placed under its direction by Congress in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the regional bureau of the International Catalogue of Scientific Literature.

In the body of this report there is given a general account of the affairs of the Institution, while the appendix presents more detailed statements by those in direct charge of the different branches of the work. Independently of this the operations of the National Museum and of the Bureau of American Ethnology are fully treated in separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

By act of Congress approved August 10, 1846, the Smithsonian Institution was created an establishment. Its statutory members are "the President, the Vice-President, the Chief Justice, and the heads of the executive departments."

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice-President and the Chief Justice of the United States as ex officio members, three members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

There has been no change in the personnel of the Board since my last report, Representatives John Dalzell, James R. Mann, and William M. Howard; and Hon. John B. Henderson, and Dr. Alexander Graham Bell, whose terms of office expired during the year, having been reappointed as Regents.

Meetings of the Regents were held on December 14, 1909, and on February 10, 1910, the proceedings of which will be printed as customary in the annual report of the Board to Congress.

Although occurring a few days after the close of the fiscal year, I may properly record here the death on July 4, 1910, of the Chancellor of the Institution, Melville W. Fuller, Chief Justice of the United States. Adequate reference to this sad event will be made in my next report to the Board.

GENERAL CONSIDERATIONS.

I have called attention heretofore to the influence that the Smithsonian Institution has had in the development of science in this country. That its usefulness is not restricted to this country is constantly evidenced in many ways. But the achievements that the Institution might accomplish, and that the scientific world expects of it, and the general good that it might do in the promotion of the welfare of the human race, continues to be greatly limited by the lack of ample funds to carry forward worthy lines of exploration and research that are constantly being presented for consideration.

During the past year the Institution's activities have been increased to some degree by gifts for the promotion of certain special lines of study, particularly in biological research.

Among the important works that might be undertaken I would especially call attention to the great advantage to this country and to the world that would result from the establishment of a national seismological laboratory under the direction of the Smithsonian Institution.

IMPORTANCE OF A NATIONAL SEISMOLOGICAL LABORATORY.

NEED.

The immense destruction of life and property by certain large earthquakes emphasizes the importance of investigations which may lead to a reduction of the damage of future earthquakes. The science of seismology is in its infancy and it is not always evident what lines of investigation will yield the most important results, hence the importance of developing larger knowledge of seismology in all directions. As an example: It was not at all realized that the accurate surveys of the Coast and Geodetic Survey in California would demonstrate that the great earthquake there in 1906 was due to forces set up by slow movements of the land which have probably been going

on for a hundred years. We have learned that slow movements of the land must precede many large earthquakes, and monuments are now being set up in California to enable us to discover future movements of the land and thus to anticipate future earthquakes. This, I think, is the most important step so far taken toward the prediction of earthquakes.

COOPERATION.

Seismological work is too large to be prosecuted successfully by the universities, but requires some central office under government supervision to encourage theoretical and observational studies and to collect and study information from all available sources. The various departments of the Government could offer material help. The Weather Bureau could furnish information regarding felt shocks and could maintain seismographs at some of their stations. Postmasters throughout the country could also report felt earthquakes. The Coast and Geodetic Survey could maintain instruments and adapt their surveys and tidal observations to the detection of slow earth movements. The army could give information regarding earthquakes felt at their outlying posts, the navy regarding earthquakes felt at sea. The Geological Survey could furnish information regarding the geological structure of earthquake regions.

SEISMOLOGICAL CLEARING HOUSE AND FOREIGN COOPERATION.

The seismological laboratory would collect and study all this information. It would serve as a clearing house for the whole country. It would also be the link to connect seismological work in this country with the work done in other parts of the world. Its director should represent the United States in the International Seismological Association which this country has joined through the Department of State.

GOVERNMENT WORK IN FOREIGN COUNTRIES.

Germany, Italy, Hungary, Roumania, Bulgaria, and Japan have maintained for some years offices for the collection and study of earthquake material. Chile and Mexico have recently established them. The work in England is under the direction of the Royal Society. Many other countries maintain stations for seismological observations. This is the only important country subject to destructive earthquakes whose government does not support the study of earthquakes.

WORK OF THE LABORATORY.

1. Collection and study of all information regarding earthquakes in the United States and its possessions. The preparation of maps showing the distribution of earthquakes and their relation to geological structure.

2. The study of special regions which are subject to frequent earthquakes to determine as far as possible where future earthquakes are likely to occur.

3. The study of the origins of earthquakes occurring under the neighboring oceans.

4. An organization of commissions to study in the field the effects produced by large earthquakes.

5. The study of proper methods of building in regions subject to earthquakes. This will require experiment.

6. The improvement of instruments for recording earthquakes.

7. Other theoretical studies.

8. The dissemination of information regarding earthquakes by bulletins or otherwise.

EQUIPMENT.

There will be required an office, a laboratory, a photographic room, a work shop, and a special instrument house. The building of this latter house and the general equipment would cost about \$6,000.

ORGANIZATION AND ANNUAL EXPENSES.

In the beginning there would be required a director, an assistant, a mechanic, a stenographer, and it would be necessary to purchase books, instruments, and material for the laboratory, etc. It is estimated that \$20,000 would equip the laboratory and meet all the expenses for the first year. After that the work will probably expand and the amount applied to equipment for the first year would meet the requirements for extension for some time after.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithsonian, 1846.....	\$515, 169. 00
Residuary legacy of Smithsonian, 1867.....	26, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000. 00
Accumulated interest on Hamilton fund, 1895.....	1, 000. 00
	<hr/>
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposit from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins.....	7, 918. 69
	<hr/>
Total amount of fund in the United States Treasury.....	944, 918. 69
Registered and guaranteed bonds of the West Shore Railroad Company (par value), part of legacy of Thomas G. Hodgkins.....	42, 000. 00
	<hr/>
Total permanent fund.....	986, 918. 69

The sum of \$251.95 was received during the year as the first payment of a bequest of \$500 made by the will of Mr. William Jones Rhees, for many years an officer of the Institution. This fund has not been invested.

In addition to the above there are four pieces of real estate bequeathed to the Institution by the late R. S. Avery, some of which yield a nominal rental and all are free from taxation.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$107,483.68, was derived as follows:

Interest on the permanent Foundation, \$58,375.12; contributions from various sources for specific purposes, \$43,230.95, and from other miscellaneous sources, \$5,877.61; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$32,176.70, on July 1, 1909, the total resources for the fiscal year amounted to \$139,660.38. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$104,295.50, leaving a balance of \$35,364.88 on deposit June 30, 1910, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1910:

International Exchanges.....	\$32, 000
American Ethnology.....	43, 000
Astrophysical Observatory.....	13, 000
National Museum:	
Furniture and fixtures.....	200, 000
Heating and lighting.....	60, 000
Preservation of collections.....	250, 000
Books.....	2, 000
Postage.....	500
Building repairs.....	15, 000
Moving collections to new building.....	4, 000
National Zoological Park.....	95, 000
International Catalogue of Scientific Literature.....	6, 000
Total.....	720, 500

EXPLORATIONS AND RESEARCHES.

As far as the resources of the Institution and contributions from individuals has permitted, various scientific explorations and researches have been carried on during the past year, and it is gratifying to report that the Institution's activities in these lines have been

somewhat more extended than in previous years. Were ample funds available to be administered under the Smithsonian Institution, the scientific work of the Government might often be supplemented by original researches of a character that could hardly be undertaken by the Government, and which would be of great service to humanity and to science.

Besides operations undertaken by the Institution itself, important biological, ethnological, and astrophysical researches have been carried on under its direction through the National Museum, the Bureau of American Ethnology, and the Astrophysical Observatory, which are discussed elsewhere in this report.

SMITHSONIAN AFRICAN EXPEDITION.

In my last report there was given an account of the setting out of the expedition to Africa in charge of Col. Theodore Roosevelt and of the results accomplished prior to June 30, 1909. This expedition, which was entirely financed from private sources through contributions by friends of the Smithsonian Institution, landed at Mombasa on April 21, 1909, and arrived at Khartoum on March 14, 1910. The collections made by it reached Washington in excellent condition and are now deposited in the National Museum. The series of large and small mammals from East Africa is, collectively, probably more valuable than is to be found in any other museum of the world. The series of birds, reptiles, and plants are also of great importance, and the study of the material representing other groups will furnish interesting results.

Colonel Roosevelt's report on the work of the expedition is as follows:

KHARTOUM, March 15, 1910.

SIR: I have the honor to report that the Smithsonian African expedition, which was intrusted to my charge, has now completed its work. Full reports will be made later by the three naturalists, Messrs. Mearns, Heller, and Loring. I send this preliminary statement to summarize what has been done; the figures given are substantially accurate, but they may have to be changed slightly in the final reports.

We landed in Mombasa on April 21, 1909, and reached Khartoum on March 14, 1910. On landing, we were joined by Messrs. R. J. Cuninghame and Leslie J. Tarlton; the former was with us throughout our entire trip, the latter until we left East Africa, and both worked as zealously and efficiently for the success of the expedition as any other member thereof.

We spent eight months in British East Africa. We collected carefully in various portions of the Athi and Kapiti plains, in the Sotik and around Lake Naivasha. Messrs. Mearns and Loring made a thorough biological survey of Mount Kenia, while the rest of the party skirted its western base, went to and up the Guaso Nyero and later visited the Uasin Gisbu region and both sides of the Rift Valley. Messrs. Kermit Roosevelt and Tarlton went to the Leikipia Plateau and Lake Hannington, and Doctor Mearns and Kermit Roosevelt made

separate trips to the coast region near Mombasa. On December 19 the expedition left East Africa, crossed Uganda and went down the White Nile.

North of Wadelai we stopped and spent over three weeks in the Lado, and from Gondokoro Kermit Roosevelt and I again crossed into the Lado, spending eight or ten days in the neighborhood of Refaj. In Gondokoro we were met by the steamer which the Sirdar, with great courtesy, had put at our disposal. On the way to Khartoum we made collections in Lake No, and on the Bahr-el-Ghazal and Barel-Zeraf. We owe our warmest thanks for the generous courtesy shown us and the aid freely given us, not only by the Sirdar, but by all the British officials in East Africa, Uganda, and the Sudan, and by the Belgian officials in the Lado; and this, of course, means that we are also indebted to the home governments of Egypt and Belgium.

On the trip Mr. Heller has prepared 1,020 specimens of mammals, the majority of large sizes; Mr. Loring has prepared 3,163, and Doctor Mearns, 714, a total of 4,897 mammals. Of birds, Doctor Mearns has prepared nearly 3,100; Mr. Loring, 899; and Mr. Heller about 50, a total of about 4,000 birds.

Of reptiles and batrachians, Messrs. Mearns, Loring, and Heller collected about 2,000.

Of fishes, about 500 were collected. Doctor Mearns collected marine fishes near Mombasa and fresh-water fishes elsewhere in British East Africa, and he and Cuninghame collected fishes in the White Nile. This makes in all of vertebrates: Mammals, 4,897; birds, about 4,000; reptiles and batrachians, about 2,000; fishes, about 500; total 11,397.

The invertebrates were collected carefully by Doctor Mearns, with some assistance from Messrs. Cuninghame and Kermit Roosevelt. A few marine shells were collected near Mombasa, and land and fresh-water shells throughout the regions visited, as well as crabs, beetles, millipeda, and other invertebrates.

Several thousand plants were collected throughout the regions visited by Doctor Mearns, who employed and trained for the work a Wunyamvezi named Makangarri, who soon learned how to make very good specimens and turned out an excellent man in every way.

Anthropological materials were gathered by Doctor Mearns, with some assistance from others. A collection was contributed by Major Ross, an American in the government service at Nairobi.

I have the honor to be, very truly, yours,

THEODORE ROOSEVELT.

HON. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of 1909 I continued my investigations in the geology of the Cambrian and pre-Cambrian rocks of the Bow River Valley, Alberta, Canada, and on the west side of the Continental Divide north of the Canadian Pacific Railway in British Columbia.

The first camp was made on the shores of Lake Louise, southwest of Laggan. From this point work was carried forward on the high mountains east, northeast, and southwest of the lake, and side trips made to the valley of the Ten Peaks and across the Bow Valley in the vicinity of Ptarmigan Lake. Many fine photographs were secured, both of the beautiful scenery and the geological sections, which

are wonderfully well shown above timber line on the higher ridges and peaks.

The measurements of the Cambrian section were carried down to a massive conglomerate which forms the base of the Cambrian system in this portion of the Rocky Mountains. This discovery led to the study of the pre-Cambrian rocks of the Bow River Valley. These were found to form a series of sandstones and shales some 4,000 feet in thickness, that appear to have been deposited in fresh-water lakes prior to the incursion of the marine waters in which the great bed of conglomerate and the Cambrian rocks above were deposited.

Completing the reconnoissance survey of the Bow River area, camp was moved to the Yoho River Canyon. In the Yoho River Canyon, one of the most picturesque and instructive areas in the great Yoho National Park of Canada, a study was made of the north side of the President Range and numerous pictures taken in that vicinity, also from Burgess Pass, north of Field.

A most interesting discovery of unique Cambrian fossils was made near Burgess Pass. Quite a number of specimens were collected before snow drove the party back to Field. Three days were spent on Mount Stephen at the famous trilobite beds before breaking up camp on September 8.

As opportunity offered during the fall and winter, field notes were written up and studies made of the sections obtained during the summer. As the results of these studies two papers are in press in the Smithsonian Miscellaneous Collections, volume 53: No. 6, "Olenellus and other Genera of the Mesonacidæ," and No. 7, "Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada." Preliminary studies were also made of the unique crustacean fauna found in the middle Cambrian rocks of Burgess Pass.

GEOLOGICAL INVESTIGATIONS IN THE FAR EAST AND IN NEWFOUNDLAND.

In my last report mention was made of a grant to Prof. Joseph P. Iddings for carrying on geological investigations in the Far East. As one of the results of his work the Institution has received an interesting collection of Manchurian Cambrian fossils, as well as collections of fossils from Japan and Java.

The Institution made a small grant to Prof. Charles Schuchert, of Yale University, to enable him to carry on certain geological studies and to obtain a collection of Cambrian fossils from the west coast of Newfoundland, the south shore of Labrador, and the Strait of Belle Isle; also collections to illustrate the transition fauna between the Cambrian and Ordovician.

STUDY OF AMERICAN MAMMALS.

Through the generosity of a friend of the Institution, Mrs. E. H. Harriman, there has been provided a trust fund yielding an income of

\$12,000 a year, which is placed under the direction of the Smithsonian Institution for the specific purpose of carrying on scientific studies, particularly of American mammals and other animals, the donor specifying Dr. C. Hart Merriam as the investigator to carry on the work during his lifetime.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

The Institution has had in contemplation for some time several important scientific explorations, and it is gratifying to state that it now seems possible that one of them—an exhaustive biological survey of the Panama Canal Zone—will be undertaken in the winter of 1910–11. Definite plans for this survey have not been decided upon at present, but these are now under consideration and it is hoped that all the arrangements may be completed and the work put in hand in a few months.

It is particularly important to science that a biological survey of the Canal Zone be made at this time, as it appears without question that it would yield important scientific results, both as regards additions to knowledge and to the collections of the United States National Museum and other museums. While the Isthmus is not so well endowed with large forms as the great continental areas, such as Africa, southern Asia, and some other regions, yet its fauna and flora are rich and diversified. The collecting which has been carried on there has been on such a rather limited scale, and chiefly along trade routes, that an extensive and thorough survey would surely produce new scientific information of great value.

A part of the fresh-water streams of the Isthmus of Panama empty into the Atlantic Ocean and others into the Pacific Ocean. It is known that a certain number of animals and plants in the streams on the Atlantic side are different from those of the Pacific side, but as no exact biological survey has ever been undertaken the extent and magnitude of these differences have yet to be learned. It is also of the utmost scientific importance to determine exactly the geographical distribution of the various organisms inhabiting those waters, as the Isthmus is one of the routes by which the animals and plants of South America have entered North America and vice versa. When the canal is completed the organisms of the various watersheds will be offered a ready means of mingling together, the natural distinctions now existing will be obliterated, and the data for a true understanding of the fauna and flora placed forever out of reach.

By the construction of the Gatun dam a vast fresh-water lake will be created, which will drive away or drown the majority of the animals and plants now inhabiting the locality, and quite possibly exterminate some species before they become known to science.

The National Museum at present has practically no Panama mammals. The birds now in the collection are chiefly from along the line of the railroad and from Chiriqui. It has comparatively few reptiles. The fresh-water fishes are poorly represented in the collections and are of special importance for comparison with South American forms. Land and fresh-water mollusks are much needed. The National Herbarium is poorly supplied with Panama plants; in fact, they are at present practically "a negligible quantity," and the American herbariums taken together do not contain a sufficient amount of material to form the basis of a general flora of Panama, which is a work much needed.

ANTIQUITY OF MAN IN SOUTH AMERICA.

In March, 1910, the Institution directed Dr. Aleš Hrdlička, Curator of the Division of Physical Anthropology, United States National Museum, to proceed to South America and Panama Canal Zone for the purpose of making anthropological researches, and particularly to undertake investigation into the question of man's antiquity in Argentina. A grant was also made to enable Mr. Bailey Willis, of the United States Geological Survey, proceeding on his way to South America in the interest of the world's topographical map, to cooperate with Doctor Hrdlička in his researches in Argentina, for it was appreciated that the problems to be met with were to an important degree of a geological nature.

The undertaking of the investigation was especially due to Mr. W. H. Holmes, Chief of the Bureau of American Ethnology, whose observations during a visit to Argentina in 1908 made apparent the far-reaching importance of the data being collected bearing on human antiquity in South America.

The subject of man's antiquity in South America dates from the meager reports concerning the scattered remains in the Lagoa Santa caves in Brazil, the casual Seguin finds in the province of Santa Fe, Argentina, and the Moreno collection of old Patagonian material in the valley of Rio Negro, and it has assumed a special importance during the last decade through a relatively large number of reports by Argentinian scientists, but particularly by Prof. F. Ameghino, of new finds of the remains of ancient man and of traces of his activities. Some of these more recent finds were so interpreted that, if corroborated, they would have a most important bearing not merely on man's early presence in the South American Continent, but on the evolution and the spread of mankind in general.

Under these conditions, and in view of the fact that some of the reports were not fully satisfactory as to their anatomical or geological details, it was deemed necessary to send down competent men who might subject the whole matter to critical revision.

It is gratifying to state that on arriving at Argentina and explaining their mission the Smithsonian representatives were afforded by the Argentinian Government, as well as by the Argentinian men of science, all facilities needed for the examination of the specimens preserved in various institutions, as well as for the prosecution of their field work. Professor Ameghino and his brother, Carlos, gave particular aid, accompanying Doctor Hrdlička and Mr. Willis personally for over three weeks along the coast from place to place where the supposedly ancient remains were discovered.

The researches occupied nearly two months. Every specimen relating to ancient man that could still be found was examined, and every locality of importance where the finds were made was visited and investigated. The evidence gathered, unfortunately, does not sustain a large part of the claims that have been made. The human bones and the archeological specimens which should represent geologically ancient man agree in all important characteristics with the bones and work of the American Indian; and the finds, while often in close relation with early Quaternary or Tertiary deposits, bear, so far as observed, only intrusive relations to these deposits. Furthermore, there are specimens the original sources of which are not so well established that scientific deductions of great consequence can be safely drawn therefrom, even though they present some morphological peculiarities.

The expedition secured numerous geological, paleontological, and anthropological specimens, some of which throw much light on the question of the antiquity of the finds to which they relate. These specimens are being identified and described in the National Museum. Doctor Hrdlička and Mr. Willis will present in due time a detailed report on their investigations.

Following the researches in Argentina, Doctor Hrdlička visited several of the anthropologically important localities on the coast of Peru and made large collections of skeletal material, which will help to settle definitely the racial problems of these regions, and will have an important bearing on the anthropology of the western part of South America.

Further explorations and collections, necessarily limited, were made by Doctor Hrdlička in Panama and Mexico. In the latter country the principal results of the visit were the opening, at the invitation of the Mexican authorities, of a highly interesting sepulcher in the ancient ruins of San Juan Teotihuacan, and the making of a series of casts from the remaining pure bloods among the Aztec descendants in Xochimilco.

The Argentina, as well as the Peruvian and Mexican, collections have been transferred to the U. S. National Museum.

RESEARCHES UNDER HODGKINS FUND.

Flying organs of insects and birds.—Under the direction of Professor von Lendenfeld, of Prague University, aided by a grant from the Hodgkins Fund, there has been carried on for the past ten years investigations on the flying organs of various insects and birds. Some of the results of these studies have been published in the Smithsonian Miscellaneous Collections in papers by Dr. E. Mascha on "The structure of wing feathers," Dr. Leo Walter on "The clasping organs attaching the hind to the fore wings in hymenoptera," and Dr. Bruno Müller on "The air sacs of the pigeons."

There was received during the past year and prepared for press a fourth paper on "The flying apparatus of the blow-fly."

These investigations were fostered by the late Secretary Langley with the hope that they would yield information useful to engineers and others interested in the problem of flight. It was the opinion of the investigator that of all the forms of insects, and indeed of all flying animals, the Diptera, such as the blow-fly, furnish the most promising pattern for a flying machine and that a working model should be built according to this pattern and experimented with.

Mount Whitney Observatory.—The construction on Mount Whitney, California, of a small steel and stone house to serve as a shelter for observers and investigators during the prosecution of researches on atmospheric air and other cognate subjects was authorized October 30, 1908, by an allotment from the Hodgkins Fund.

This spot had been selected as an observation point by the late Secretary Langley as far back as 1881, and had been visited later by other scientific investigators, including Professor Campbell, of the Lick Observatory, and Director Abbot, of the Smithsonian Astrophysical Observatory, each of whom realized the unusual advantages offered by this mountain as a site for a meteorological and atmospheric observatory.

Before erecting the shelter it was necessary to build a trail to the top of the peak, 14,502 feet above sea level, in order to transport the building material, supplies, and instruments. Many dangers and hardships were undergone by the men who accomplished this work, but finally the trail was completed and the equipment packed up the mountain.*

The actual work of construction of the shelter was begun July 28, 1909, when the first pack train reached the summit, and was quite completed by August 27, 1909, when summer observations were begun by Director Abbot, of the Smithsonian Astrophysical Observ-

* A more detailed account of the work, "A shelter for observers on Mount Whitney," by C. G. Abbot, was published January 12, 1910, in the Smithsonian Miscellaneous Collections, vol. 56, pp. 499-506.

atory, and Director Campbell, of the Lick Observatory, who was engaged in a study of the spectrum of Mars.

The erection of the shelter has already proved a most beneficial undertaking, and it will undoubtedly serve for many years as such for observation parties not only of the Smithsonian Institution but of other institutions desiring to benefit by the conditions and advantages offered to scientists by this exceptional location. Applications for permission to use this shelter by scientific research parties should be made to the Secretary.

Relation of atmospheric air to tuberculosis.—In February, 1908, the Institution offered a prize of \$1,500 for the best treatise on "The relation of atmospheric air to tuberculosis," to be awarded in connection with the International Congress on Tuberculosis held in Washington in September of that year, but owing to the great work of translating, reading, and classifying the 81 papers submitted, the committee on award has not, as yet, made a final report; although much progress is reported and the final announcement is expected shortly.

Publications under Hodgkins Fund.—There was published during the year as a Hodgkins Fund publication a volume on "Mechanics of the Earth's Atmosphere," consisting of a series of 25 papers translated from the French and German by Professor Abbe, and forming a connected treatise on that subject.

Another volume issued at the cost of the Hodgkins Fund was an exhaustive bibliography of aeronautical literature compiled by Mr. Paul Brockett, and containing titles of 13,500 papers on aviation in all languages published previous to July 1, 1909.

THE SMITHSONIAN TABLE AT THE NAPLES ZOOLOGICAL STATION.

For over seventeen years the Institution has maintained at the Naples Zoological Station a table for the use of American biologists, and the lease has been renewed for a period of three years from January 1, 1910, at an annual rental of 2,500 francs.

The founder and director of the station, Dr. Anton Dohrn, always showed a most cordial spirit of helpfulness toward the Institution in arranging for its appointees, and it is with particular regret that I report his death, which occurred on September 29, 1909. At the request of the Institution, the Department of State designated the American consul at Naples to represent the Institution officially at the funeral.

Doctor Dohrn has been succeeded by his son, Dr. Reinhard Dohrn, who has expressed his earnest adherence to the policies adopted by his father, and assures the Institution of his hearty cooperation during his administration.

During the year the following American biologists were appointed to the Smithsonian Table:

Prof. H. D. Senior, of the College of Medicine of the Syracuse University, who continued his researches in the angioblast of the trunk in Teleosts through studies of the origin of the circulation in *Amphioxus*.

Dr. R. M. Strong, of the University of Chicago, whose work was confined to some general studies of chromatophores, which occur in two species of Cephalopods and in three species of Crustacea.

Dr. W. D. Hoyt, formerly of Johns Hopkins University, but now of Rutgers College, whose studies comprehended the periodicity in the fruiting and cultural experiments in alternations of generations of marine algæ.

Prof. Charles L. Edwards, of Trinity College, who continued his investigations in the variations in *Synapta inhoerens* and other holothurians.

Prof. Charles W. Greene, of the University of Missouri, who worked on the comparative physiology of fishes.

Applications for future occupancy of the Table have been received during the year from Dr. S. R. Williams, of the Miami University, and from Dr. Sergius Morgulis, of Harvard University.

The advisory committee on the Smithsonian Table has, as always, rendered invaluable aid in the examination of the credentials of applicants, and it is desired to here record the Institution's appreciation of their assistance.

During the year an important change in the personnel of the committee took place. Dr. John S. Billings, who served for many years as its chairman, tendered his resignation, and it is much regretted that a relationship so helpful and agreeable has been thus terminated. The Institution is fortunate, however, in securing the cooperation of Dr. Carl H. Eigenmann, professor of zoology at the Indiana University and director of the biological station maintained in connection with that establishment. The present organization of the committee is as follows:

Dr. Theodore Gill, of the Smithsonian Institution, chairman; Dr. C. Wardell Stiles, of the Bureau of Public Health and Marine-Hospital Service, secretary; Dr. E. B. Wilson, of the Columbia University, New York; Dr. Carl H. Eigenmann, of the Indiana University.

PUBLICATIONS.

The principal medium for carrying out one of the fundamental functions of the Institution, "the diffusion of knowledge," is through its publications. The Smithsonian Contributions to Knowledge, the Smithsonian Miscellaneous Collections, and the Smithsonian annual

reports now comprise a library of about 150 quarto and octavo volumes covering practically every branch of scientific knowledge, and if to these be added the publications issued under its direction by the National Museum, the Bureau of Ethnology, and the Astrophysical Observatory, the scientific literature produced through the Institution aggregates about 350 volumes, made up of several thousand memoirs and papers.

The works issued at the expense of the Institution proper are necessarily in limited editions, but they are so distributed to the principal libraries throughout the world as to be available for general reference by all who need them. The annual reports, the general appendix of which is made up of selected papers reviewing progress in scientific work in all its branches, is a public document, and through the liberality of Congress is published in larger numbers than the other Smithsonian series, although the editions of this more popular work are each exhausted soon after publication.

In the series of Contributions, reserved for original additions to knowledge, no memoir was issued during the year.

Langley memoir on mechanical flight.—Two memoirs by the late Secretary Langley, entitled "Experiments in Aerodynamics" and "The Internal Work of the Wind," were printed in 1891 and 1893, respectively, as parts of volume 27 of the Smithsonian Contributions to Knowledge, and several editions of each have since been published. A third memoir, dealing with later experiments to December 8, 1903, to be entitled "Langley Memoir on Mechanical Flight," was to complete that volume. This work was in preparation at the time of Mr. Langley's death in 1906, and the manuscript of the first part covering his experiments down to November, 1896, had been written by him and partially revised for press. The further editorial revision of that part and the completion of part 2 to bring the work down to the close of the experiments on December 8, 1903, was placed in the hands of Mr. Charles M. Manly, who had for several years been Mr. Langley's chief assistant in his experiments. The completed manuscript is now nearly ready for the press and it will probably be published within a few months.

It is hoped that later it may be practicable to have tabulated and published the extensive technical data of observations of the working of the model aerodromes and various types of engines, propellers, planes, and other apparatus with the use of the pendulum and whirling-arm.

It is of interest here to note that on August 6, 1907, a French aviator made a flight of nearly 500 feet with a machine of the Langley type.*

* Recent Progress in Aviation. By Octave Chanute. In Journal Western Society of Engineers, vol. 15, No. 2, April, 1910. See also various French and Italian aeronautical periodicals giving some details of these experiments.

Smithsonian Miscellaneous Collections.—Thirty papers were added to the Miscellaneous Collections, including a number of biological and anthropological articles, and four volumes of considerable size on The Mechanics of the Earth's Atmosphere, Landmarks of Botanical History, Bibliography of Aeronautics, and Recalculation of Atomic Weights, all of which are enumerated in detail in the appendix to this report.

Among the papers published just at the close of the year was one by Dr. F. W. Clarke on "Chemical denudation" and one by Dr. George F. Becker on the "Age of the earth."

The Smithsonian Physical Tables have been revised and extended to bring the work within the range of recent advances in the science of physics, and the new edition has been put to press. The several series of Smithsonian meteorological, geographical, physical, and mathematical tables continue to be in demand by students, and new editions are required at comparatively frequent intervals.

As mentioned on another page, three papers have been added to the series descriptive of my researches in Cambrian Geology and Paleontology.

Harriman Alaska Expedition.—Arrangements are being made by which the publication of the series of volumes on the results of the Harriman scientific expedition to Alaska in 1899 will be transferred to the Smithsonian Institution and the work will hereafter be known as the Harriman Alaska series of the Smithsonian Institution. The remainder of the edition of the 11 volumes privately printed, as well as volumes in preparation, will bear special Smithsonian title pages, and all will be distributed under the auspices of the Institution.

National Museum publications.—The National Museum publications during the year included the annual report on its operations, about 50 papers, chiefly biological, in the proceedings, 8 bulletins, and 7 botanical papers in the series of Contributions from the National Herbarium. The most elaborate of these works is Bulletin No. 70, devoted to the National Gallery of Art, by Assistant Secretary Richard Rathbun. This book reviews the history of the Art Gallery and gives a catalogue of the collections with illustrations of some of the most important paintings.

Bureau of Ethnology.—The Bureau of American Ethnology issued five bulletins during the year, including works on the unwritten literature of Hawaii, by Doctor Emerson, and "Antiquities of the Mesa Verde National Park," by Doctor Fewkes.

Society publications.—The annual reports of the American Historical Association and of the National Society of the Daughters of the American Revolution were received from those organizations and communicated to Congress in accordance with their national charters.

Allotments for printing.—The allotments to the Institution and its branches, under the head of public printing and binding, during the past fiscal year, aggregating \$72,700, were, as far as practicable, expended prior to June 30. The allotments for the year ending June 30, 1911, are as follows:

For the Smithsonian Institution for printing and binding annual reports of the Board of Regents, with general appendixes.....	\$10, 000
For the annual reports of the National Museum, with general appendixes, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	34, 000
For the annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding for the bureau, including the binding in half turkey, or in material not more expensive, scientific books and pamphlets acquired by the bureau library.....	21, 000
For miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature.....	100
National Zoological Park.....	200
Astrophysical Observatory	200
For the annual report of the American Historical Association.....	7, 000
Total.....	72, 700

ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The committee on printing and publication has continued to examine manuscripts proposed for publication by the branches of the Institution and has considered various questions concerning public printing and binding. Twenty-five meetings of the committee were held during the year and 106 manuscripts were passed upon. The personnel of the committee is as follows: Dr. Frederick W. True, head curator of biology, United States National Museum, chairman; Mr. C. G. Abbot, director of the Astrophysical Observatory; Mr. W. I. Adams, of the International Exchanges; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution; Mr. F. W. Hodge, ethnologist, the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum; and Dr. Leonard Stejneger, curator of reptiles and batrachians, United States National Museum.

THE LIBRARY.

The Smithsonian Library as at present organized includes (1) the Smithsonian deposit in the Library of Congress, (2) the Smithsonian office library, (3) the library of the National Museum, (4) the library of the Bureau of American Ethnology, (5) the library of the Astro-

physical Observatory, and (6) the library of the National Zoological Park. The Bureau of Ethnology Library, together with the business offices of the Bureau, was during the past year transferred to the Smithsonian building, where it is more accessible than heretofore for reference.

The total additions to these several libraries during the year aggregated more than 23,000 volumes, pamphlets, and serial publications.

The library of the National Museum, which is subdivided into 31 sectional libraries for the convenience of the several departments and divisions, now numbers 38,300 volumes, 61,858 unbound papers, and 110 manuscripts, and the Bureau of Ethnology library contains 16,050 volumes, 11,600 pamphlets, several thousand periodicals, and a large collection of manuscripts.

The Smithsonian deposit in the Library of Congress was increased by the addition of 2,653 volumes, 2,879 parts of volumes, 1,396 pamphlets, and 623 charts, the total accession entries now having reached the half-million mark. This library is becoming more and more valuable as the sets of transactions and memoirs of the learned institutions of the world and of scientific periodicals are each year made more complete.

There was published during the year a bibliography of aeronautics, prepared by the assistant librarian. This work contains references to about 13,500 books or papers on that subject, most of which are available for reference in Washington, the collection of aeronautical literature in the Smithsonian office library having been greatly increased in recent years.

THE LANGLEY MEDAL.

In memory of the late Secretary Samuel Pierpont Langley and his contributions to the science of aerodromics, the Board of Regents on December 15, 1908, established the Langley medal, "to be awarded for specially meritorious investigations in connection with the science of aerodromics and its application to aviation."

As stated in my last report, the first award of the medal was voted by the Board of Regents to Wilbur and Orville Wright, "for advancing the science of aerodromics in its application to aviation by their successful investigations and by their successful demonstrations of the practicability of mechanical flight by man."

The brothers Wright were immediately communicated with in France and accepted an invitation to be present at the Board meeting of February 10, 1910, to receive the medals in person. On the date mentioned they were introduced to the Board and the formal presentation was made. Dr. Alexander Graham Bell reviewed the progress made in the science of aviation by the investigations and experiments

of Professor Langley, culminating on May 6, 1896, in the demonstration that a model aerodrome heavier than air could support itself and fly under its own power. Professor Langley thus became "the great pioneer of aerial flight." *

Senator Lodge made the formal presentation speech, in which he said:

It is peculiarly the characteristic of Americans to be pioneers; pioneers across the great continent on which we live, pioneers by sea, and now pioneers by air; and to Wilbur and Orville Wright, pioneers of what Doctor Langley called "the great universal highway overhead," who by their achievements have added honor to the American name and nation, we now present the first Langley medal that the institution has conferred.

After receiving the medals from the hands of the Chancellor the recipients expressed their great pleasure in being considered worthy of such distinction. Mr. Wilbur Wright called attention to the valuable scientific researches by Professor Langley in matters relating to the physical properties of the air and to the great importance of extending these researches, particularly to determine the coefficient of air pressure; that is, the pressure of wind at a certain speed on a plane of a certain size.

As an indication of their early confidence in the successful solution of the problem of aerial navigation, the Wright brothers said:

The knowledge that the head of the most prominent scientific institution of America believed in the possibility of human flight was one of the influences that led us to undertake the preliminary investigations that preceded our active work. He recommended to us the books which enabled us to form sane ideas at the outset. It was a helping hand at a critical time, and we shall always be grateful.

LANGLEY MEMORIAL TABLET.

In accordance with a resolution adopted by the Board of Regents on December 15, 1908, designs have been prepared, and are under consideration by a special committee, for "the erection in the Institution building of a tablet to the memory of Secretary Langley, setting forth his services in connection with the subject of aerial navigation." The committee's recommendations are that the tablet be modeled in bronze in low relief along the lines of the work of St. Gaudens, to contain a bas-relief of the bust of Mr. Langley, and that in the background there be represented a model of the Langley aerodrome in full flight, with the date of its first flight. The tablet is also to bear the lettering "Samuel Pierpont Langley, 1834-1906, Secretary of the Smithsonian Institution, 1887-1906," and to bear also the text

*The full addresses by Doctor Bell and others on this occasion will be printed in the report of the Board to Congress.

of what is known as Langley's Law as to relation of speed to power in aerial motion, as follows:

These new experiments (and theory also when viewed in their light) show that if in such aerial motion, there be given a plane of fixed size and weight, inclined at such an angle, and moved forward at such a speed, that it shall be sustained in horizontal flight, then the more rapid the motion is, the less will be the power required to support and advance it.

COMMISSION ON ZOOLOGICAL NOMENCLATURE.

An International Commission on Zoological Nomenclature, consisting of five members, was appointed in 1895 by the Third International Zoological Congress, held at Leyden, Holland, for the purpose of studying the various codes of nomenclature and to report upon the same at a later congress. At the congress at Cambridge, England, in 1898, the commission was made permanent and increased to fifteen members. At the Berne Congress, in 1904, the commissioners were divided into three classes of five, each class to serve for nine years.

Committees on nomenclature, to cooperate with the International Commission, have been organized in the United States by the Entomological Society of America, the Association of Economic Entomologists, the American Ornithologists' Union, and the Society of American Zoologists.

A code of nomenclature was adopted at the Berlin congress in 1901 and was amended at the Boston congress in 1907. Prior to the Boston congress a desire had developed among zoologists that the commission should serve as a court of interpretation of the code, and in accordance therewith the commission presented to the Boston congress five opinions, which were ratified by the congress.

Since the Boston meeting a number of questions on nomenclature have been submitted to the commission for opinion. Owing to the amount of time consumed in communicating with the fifteen commissioners it was impossible to act promptly upon these cases, but in December, 1909, the Smithsonian Institution gave a grant to provide for the clerical work for a period of three years, and since that time it has been possible to render the opinions more promptly.

The commission has no legislative power. Its powers are restricted to studying questions of nomenclature, to reporting upon such questions to the international congress, and to rendering opinions upon cases submitted to it.

The Smithsonian Institution has also undertaken the publication of the opinions of the commission for a limited period and their distribution to important libraries and to zoological specialists throughout the world. The first issue of these opinions was in press at the close of the fiscal year and included opinions 1 to 25, covering several

important questions, making a pamphlet of 61 pages. In connection with the summary of each opinion there is given a statement of the case and the discussion thereon by the members of the commission.

The commission has issued the following rules to be followed in submitting cases for opinion:

(1) The commission does not undertake to act as a bibliographic or nomenclatural bureau, but rather as an adviser in connection with the more difficult and disputed cases of nomenclature.

(2) All cases submitted should be accompanied by (a) a concise statement of the point at issue, (b) the full arguments on both sides in case a disputed point is involved, and (c) complete and exact bibliographic references to every book or article bearing on the point at issue.

The more complete the data when the case is submitted, the more promptly can it be acted upon.

(3) Of necessity, cases submitted with incomplete bibliographic references can not be studied, and must be returned by the commission to the sender.

(4) Cases upon which an opinion is desired may be sent to any member of the commission, but—

(5) In order that the work of the commission may be confined as much as possible to the more difficult and the disputed cases it is urged that zoologists study the code and settle for themselves as many cases as possible.

INTERNATIONAL CONGRESSES AND CELEBRATIONS.

Congress of Americanists.—The Institution was represented at the Seventeenth International Congress of Americanists held at Buenos Aires, May 16 to 21, 1910, by three delegates, Dr. Aleš Hrdlička, of the United States National Museum; Mr. Bailey Willis, of the United States Geological Survey; and Rev. Charles Warren Currier, of the Catholic University of America. Doctor Hrdlička reports that the meeting was very well attended, particularly by delegates from the various republics of South America. There were read nearly fifty papers, many of them of considerable interest, and related chiefly to the natives of South America. Mr. Bailey Willis presented a communication on "Changes in the geological environment during the Quaternary period," and Doctor Hrdlička gave a résumé of the present knowledge on "Artificial deformation of the human skull, with special reference to America."

The Institution also appointed Dr. Aleš Hrdlička its representative at the second meeting of the above congress to be held in the City of Mexico, September 7 to 14, 1910.

Upon the suggestion of the Smithsonian Institution, the Department of State designated Doctor Hrdlička, Mr. Willis, and Doctor Currier as representatives of the United States at the above congress at Buenos Aires.

Geological Congress.—Dr. George F. Becker, of the United States Geological Survey, was designated as the representative of the Smithsonian Institution at the Eleventh International Geological Con-

gress at Stockholm, Sweden, in August, 1910. A paper expressing my view on "The abrupt appearance of the Cambrian fauna" was prepared to be read at this congress.

International American Scientific Congress.—Mr. Bailey Willis, of the United States Geological Survey, was appointed a delegate in behalf of the Smithsonian Institution to the International American Scientific Congress to be held at Buenos Aires, July 10 to 25, 1910, on the occasion of the Argentina centennial.

Congress on Ornithology.—Mr. William Dutcher, president of the National Association of Audubon Societies, was designated as the representative on the part of the Smithsonian Institution and United States National Museum at the Fifth International Congress on Ornithology held at Berlin from May 30 to June 4, 1910, and upon the nomination of the Institution Mr. Dutcher was also accredited by the Department of State as a delegate on the part of the United States to that congress.

Zoological congress.—The following gentlemen were designated as delegates to represent the Smithsonian Institution and United States National Museum at the Eighth International Zoological Congress to be held at Graz, Austria, from August 15 to 20, 1910, and the Department of State designated them as delegates on the part of the United States: Dr. Charles Wardell Stiles, of the Public Health and Marine-Hospital Service, and custodian of Helminthological Collections in the National Museum; Dr. Henry Haviland Field, an American naturalist and director of the Concilium Bibliographicum; Dr. William E. Kellicott, professor of biology in Goucher College, Baltimore; and Mr. Austin H. Clark, Assistant Curator of the Division of Marine Invertebrates, United States National Museum.

Congress of Botany.—Dr. Frederick V. Coville, of the United States National Museum, and Dr. Joseph C. Arthur, of Purdue University, were designated as representatives of the Smithsonian Institution to the Third International Congress of Botany held at Brussels May 14 to 22, 1910.

Aeronautical Exposition.—The Institution was invited to exhibit some models of the Langley flying machines at an aeronautical exposition at Frankfort-on-the-Main July 10 to October 10, 1909, but it was impracticable to do more than send a series of photographs of the model machines in flight on May 6, 1896, and August 8, 1903, and some views of the full-size aerodrome on the launching ways near Widewater, Virginia.

Inauguration of President Lowell.—The President and Fellows of Harvard College invited the Smithsonian Institution to be represented by a delegate at the inauguration on October 6 and 7, 1909, of Abbott Lawrence Lowell, LL. D., as the twenty-fourth president of Harvard University. It was my pleasure to attend the ceremonies

at Cambridge as such delegate and to present in engrossed form the greetings and congratulations of the Institution.

University of Oviedo.—The Institution received from the University of Oviedo, Spain, a copy of an address and a medal commemorative of the third centenary of that university.

Russian Entomological Society.—The Institution found it to be impracticable to send a delegate to the fiftieth anniversary of the founding of the Entomological Society of Russia at St. Petersburg March 11, 1910, but forwarded its formal congratulations and good wishes.

Conference of librarians.—Mr. Paul Brockett, assistant librarian of the Institution, was authorized to accept the invitation of the secretary of the Institut International de Bibliographie to take part in and become a member of the Congrès International de Bibliographie et de Documentation to be held at Brussels, Belgium, August 25 to 27, 1910, and he was also designated to represent the Institution in the Congrès International des Archivistes et des Bibliothécaires at the same place on August 29 to 31, 1910.

MISCELLANEOUS.

George Washington Memorial Building.—At the February meeting of the Board of Regents I spoke of the movement of the George Washington Memorial Association to erect in Washington a memorial building, which would be used as a center for the scientific, literary, patriotic, and educational associations of the country. It is believed that such a building would afford a much-needed relief to the present crowded condition of the Smithsonian building, resulting in part by the accommodations offered to the National Academy of Sciences, the American Association for the Advancement of Science, the American Historical Association, and others.

The proposed building would be erected by popular subscription.

Preservation of American antiquities.—Under the requirements of law (act of June 8, 1906), the Institution has continued its consideration of applications for permits to make archeological excavations or collections on the public domain of the United States, including requests for researches in the Aleutian Islands, Arizona, New Mexico, Utah, and California.

Gifts.—Among the gifts to the Institution during the year special mention may be made of the C. Hart Merriam collection of 5,800 specimens of skins of mammals and about 6,000 skulls, including 100 full skulls of mammals and 235 skulls of seals presented by Mrs. Edward H. Harriman.

Additional gifts by Mr. Freer and others are referred to in connection with the National Gallery of Art.

NATIONAL MUSEUM.

A summary of the operations of the National Museum is given as usual in the appendix to this report and full details are set forth by the Assistant Secretary in a separate volume, and need not therefore be fully treated here.

New building.—At the close of the year the exterior of the new Museum building had been practically completed. Several months' work, however, remained to be done to finish the south pavilion or rotunda. Provision has been made for the improvement of the grounds immediately about the building, including granolithic roads and walks, grading, and readjustment of roadways.

The transfer of collections, laboratories, and workshops to the new building has progressed as rapidly as practicable considering that the floor area to be provided with furniture and other new equipment is about 10 acres.

The collections of the National Gallery of Art, as mentioned below, were transferred to the middle hall of the new building and opened to the public in March, and in connection therewith some of the more interesting ethnological groups and historical exhibits were installed in the surrounding hall and adjacent ranges. It was not practicable to open any other portions of the building to the public, although more than half of the natural history collections, both reserve and exhibition, had been transferred to their new quarters.

Art textiles.—The removal of the paintings from the old building has afforded more ample space for the display of the art textiles and fabrics, consisting of laces, embroideries, tapestries, brocades, and velvets; also fans, enamels, porcelains, jewelry, etc. As mentioned in my last report, these objects were brought together at the suggestion of Mrs. James W. Pinchot, who has given personal attention to their collection and arrangement.

Accessions.—The additions to the Museum during the year aggregated 970,698 specimens, as compared with 250,000 in the year preceding. The most noteworthy collection of the year was several thousand specimens of mammals, birds, reptiles, batrachians, and other animals, besides several thousand plants, received from the Smithsonian African Expedition under the direction of Col. Theodore Roosevelt, more fully referred to on another page. Other important accessions in the several departments of the Museum are enumerated by the Assistant Secretary in the appendix to the present report. About 800,000 entomological specimens, received from the Department of Agriculture, were varieties of beetles and other insects injurious to forest trees, which had been accumulated during investigations by the Bureau of Entomology.

Distribution of specimens.—The Museum has taken a special interest for many years, to as great an extent as appropriations would permit, in the preparation and distribution to educational establishments throughout the country of series of duplicate specimens pertaining chiefly to natural history. During the past year about 6,000 such specimens were distributed.

National Herbarium.—The removal of the archeological collections from the large upper hall of the Smithsonian building has afforded an opportunity for furnishing adequate quarters for the National Herbarium, which for many years has occupied crowded and unsuitable space in the galleries of the National Museum.

Growth of Museum.—The national collections have so increased in size and value as to make them comparable with the similar collections of the greater European countries, and with the occupation of the new building they may now be housed and arranged in an appropriate and convenient manner. This expansion, however, involves a much greater annual expenditure than heretofore, the larger portion of which is called for in connection with the exhibition halls, maintained for the benefit of the public. The extent of these halls has been about trebled, thus offering an opportunity for the preparation and mounting for display of many additional specimens, a work that will be pushed as rapidly as available funds will permit in order that the operations of the Museum may be commensurate with their importance to the public interests and to science.

THE NATIONAL GALLERY OF ART.

As stated in my last report the collections of the National Gallery of Art had then so increased that they could no longer all be accommodated in the old National Museum building, and Congress having failed to authorize the adaptation of the large hall of the Smithsonian building for their proper exhibition, it had become necessary to make preparations for their display temporarily in one of the halls in the new Museum building. The space selected was the central part of the middle hall, 50 feet wide and about 130 feet long, with a central skylight. Screen walls were constructed, divided into seven rooms. An informal opening of the gallery was held on March 17, 1910, which was largely attended.

The collections were increased during the year by the further gift from Mr. William T. Evans of 32 paintings and 1 fire etching on wood, and by a considerable number of loans from various individuals. It became necessary at the close of the year to make preparation for extending the limits of the gallery so as to include the entire space below the skylight in the middle hall.

The history of the gallery and a catalogue of the collections was published during the year in a volume of 140 pages as Bulletin No.

70 of the National Museum. This was prepared by the Assistant Secretary, Dr. Richard Rathbun, who has been most arduous in his efforts to promote the gallery's growth.

On the occasion of the first annual convention of the American Federation of Art, held in Washington May 17-19, 1910, I had the pleasure of presenting a brief account of the National Gallery, and a private view of the collections was extended to the members of the convention and friends on the afternoon of May 17.

The subject is of such importance that it seems proper here to recall in a general way the origin of the gallery and its present condition and needs.

In 1840, while the question of what should be done with the Smithsonian bequest was under consideration in Congress, a few gentlemen organized the National Institute, which was in 1842 incorporated by Congress for a term of twenty years, at the expiration of which its collections were to be transferred to the Government. This institute collected a few works of art, which were subsequently transferred to the Smithsonian Institution.

The act of 1846 creating the Smithsonian Institution provides that all objects of art belonging to the United States which may be in the city of Washington shall be delivered to such persons as may be authorized by the Board of Regents to receive them and that they shall be arranged and classified in the building erected for the Institution.

In 1849, under the authority of the Regents, Secretary Henry purchased the Marsh collection of engravings and works of art.

In 1858 the collections in the Patent Office Museum were turned over to the Smithsonian Institution, and in 1862 the collections of the National Institute were transferred, on the expiration of its charter. These collections included a few paintings of merit and sundry art objects.

In 1879 the Catlin collection of Indian paintings was presented to the Institution by Mrs. Joseph Harrison, of Philadelphia.

A few additions were made from time to time up to 1906, but they were relatively of little importance, and, with the collections already in hand, were scattered about in the Smithsonian building and the National Museum building erected in 1879.

In 1903, when the will of Harriet Lane Johnston was presented for probate, it was found that she had bequeathed her entire collection of paintings and art objects to the Corcoran Gallery of Art, under certain specific conditions and subject to the provision that in the event of a national art gallery being established in the city of Washington they should be transferred to the said National Art Gallery and become the absolute property of that gallery. The Corcoran Gallery declined the bequest under the conditions, and the

executors of the Johnston estate asked the courts for a construction of the clause in the testament providing that the collection be given to a national art gallery. This suit was filed on February 7, 1905, in the Supreme Court of the District of Columbia, and by an order of the court dated July 18, 1906, the collections were delivered to the Smithsonian Institution on August 3, 1906, the court deciding that there had been established by the United States of America in the city of Washington a national art gallery within the meaning of Harriet Lane Johnston's will.

In 1904, Mr. Charles L. Freer, of Detroit, offered his art collection to the Smithsonian Institution, under certain specified conditions, and also offered to furnish the means for erecting, after his death, a suitable building to receive the collection. This collection was formally accepted by the Regents of the Smithsonian Institution in 1906. It includes more than 2,250 objects, including paintings in oil, water color, and pastel, drawings and sketches, etchings and dry points, lithographs, oriental pottery, and other objects.

The action of Harriet Lane Johnston and Mr. Charles L. Freer called the attention of all interested in art, to the fact that there was a national gallery, and that under the care of the Smithsonian Institution it was making conservative and satisfactory progress.

In March, 1907, Mr. William T. Evans, of Montclair, New Jersey, announced to the Institution his desire to contribute to the National Gallery a number of paintings by contemporary American artists of established reputation. In transmitting the first installment of paintings, he wrote:

I have every reason to believe that you will like my selections, but should any of the examples not hold well, others can be substituted, as it is my desire to have every artist represented at his best. As already intimated, I intend that the present gift may not be considered as final. Additions may be made from time to time as opportunities occur to secure exceptional works.

Fifty paintings were enumerated in the list which accompanied this letter. Up to June 30, 1910, Mr. Evans had presented 114 selected paintings, representing 80 artists. These, with the paintings already in the possession of the Institution, bring the exhibit now installed in the large hall of the new Museum building to more than 160.

The world-wide interest in the National Gallery has been increasing rapidly during the past three years, and we believe, without question, that the collections will grow quite as rapidly as facilities can be provided for their proper installation and exhibition. The collection, including the Freer collection, is particularly strong in pictures by American artists, and it is well that it should be so, in order that it may have a strong national tone. The Harriet Lane Johnston collection has given the Gallery fine examples of several of the mas-

ters of European art, and we hope that this feature will be strengthened from time to time as the years go on.

The Charles L. Freer collection contains many beautiful paintings by Tryon, Dewing, Thayer, and the unexcelled series of Whistler paintings, pastels, drawings, and sketches; also the beautiful Peacock room. In oriental art the collection representing Japanese and Chinese paintings from the tenth to the nineteenth century can not be duplicated in any single gallery in the world, and the bronzes and pottery are beautiful, and to a large extent unique and of great historical and artistic value.

The question of a suitable building for the great Freer collection has been happily settled by Mr. Freer, but we still have to consider the problem of properly housing and exhibiting the collections now in the new natural history museum building, as their present installation is of a temporary character.

I have hope that some of our strong men or women who have the means will see the great opportunity that is now offered to present to the nation a suitable building that will be an epoch-making incident in the development of national art and a monument to the culture and patriotism of the one so wise as to take advantage of the opportunity.

The American people, as represented by Congress, have just provided a large and beautiful building for the collections of natural history, and in due time it is expected that sufficient interest will be taken in the art collections of the Government to provide a suitable home for them. This, however, is not to be anticipated in the immediate future, although the collections now in hand and what will be inevitably received if accommodations are provided for them will make a most creditable showing.

I have been frequently asked what effect the development of a national art gallery would have upon the Corcoran Gallery of Art at Washington, and in response I have quoted the effect of the establishment of the Leland Stanford University, in California, upon the State University of California. Prior to the establishment of the Leland Stanford University the State University was a relatively small affair. Its friends, realizing that they must approach the standard set by the proposed new university, at once cast about for strong leaders and strong men for their faculty, and the result in a few years was that California had one of the great research universities of the country in the Leland Stanford and one of the great state universities, with thousands of students. The Corcoran Gallery, with its splendid history, fine building, and beautiful collection of paintings and statuary, has an international fame, and will grow stronger and more rapidly under the stimulus of a greater art interest, caused by the development of the national gallery. One will

supplement the other, and anyone visiting Washington at all interested in art will be obliged to visit both.

The most sincere and hearty cooperation has existed in the past between the two institutions, and it will continue in the future, the only rivalry being that each will endeavor to hold to a higher standard and uplift the art ideals in America.

In order to insure the maintenance of the gallery at a proper standard there has been organized a permanent honorary committee of men competent to pass judgment on the quality of such works of art as might be presented for acceptance by the gallery and who are also so identified with the art interests of the country as to assure to the public and especially to the lovers and patrons of art the wholly worthy purpose of this movement on behalf of the nation. This advisory committee is constituted as follows:

Mr. Francis D. Millet, president; Mr. Frederick Crowninshield, representing the Fine Arts Federation, of which he is president; Mr. Edwin H. Blashfield, representing the National Academy of Design; Mr. Herbert Adams, representing the National Sculpture Society, of which he is president; and Mr. William H. Holmes, of the Smithsonian Institution, secretary of the committee.

BUREAU OF AMERICAN ETHNOLOGY.

The Bureau of American Ethnology has in the past accomplished much in its study of the habits, customs, and beliefs of the American aborigines. The results of these researches have in considerable measure been permanently recorded in annual reports and bulletins that contain a mass of valuable information on aboriginal arts and industries, forms of government, religious and social customs, languages, and mental and physical characteristics. Although a large body of material still awaits final study and arrangement and much remains to be done both in field and office work, yet the investigations of the Bureau have reached such a stage as to render it possible to summarize some of the results in the form of handbooks designed especially for the use of schools and nonprofessional students. The demand for the handbooks already issued or in preparation has been very large.

The Indians form one of the great races of mankind, and the world looks to the Government for all possible knowledge that is still available concerning this race before it shall have vanished by assimilation in the great body of the American people.

The Bureau has likewise done much in the exploration and preservation of antiquities, especially the prehistoric ruins in the southern Rocky Mountain region, and will continue work in this direction and press it more rapidly while there is still opportunity to save them

from vandalism and to preserve them for the benefit of future generations.

There is present need of ethnological researches among the tribal remnants of the Mississippi basin, since the opportunities for making and preserving a permanent record of the aborigines which played such an important part in the early history of the Middle West are rapidly passing.

Ethnological researches should also be made in the Hawaiian Islands and in Samoa. Little reliable information regarding the ethnology of these insular possessions has been recorded, and it is hoped that Congress may soon provide the means for initiating among their natives researches of the same general character as those now being conducted among the American Indian tribes.

The various lines of ethnological studies carried on by the Bureau during the past year are presented in detail in the appendix to the present report.

The removal of some divisions of the National Museum to the new Museum building afforded an opportunity for the transfer in December last of the offices and library of the Bureau of American Ethnology from rented quarters to the Smithsonian building. It was found desirable at the same time to reorganize the office force, Mr. Holmes, Chief of the Bureau for several years, having resumed the office of head curator of the Department of Anthropology in the National Museum.

With a view to economy in the transaction of the routine business of the Bureau, much of the clerical and all the laboring work was concentrated by placing the routine correspondence and files, the accounts, the shipment of publications, and the care of supplies and other property in immediate charge of the office of the Smithsonian Institution. It was thus found possible to render a larger proportion of the annual appropriation available for research work.

INTERNATIONAL EXCHANGES.

Several additional governments have entered into the immediate exchange of their parliamentary records during the past year, 26 countries now taking part in this exchange with the United States. A list of the countries to which the daily issue of the Congressional Record is sent will be found in the appended report on the exchanges. The Institution is still in correspondence with other governments regarding this immediate exchange, and from time to time additions will no doubt be made to the list of those countries participating. It may be stated, in this connection, that the exchange here alluded to is separate and distinct from the exchange of official documents which has existed between the United States and other countries for a number of years.

While the number of packages handled during the past year was 7,250 less than during the preceding twelve months, there was a gain in weight of 8,515 pounds. The number of packages passing through the service was 221,625, and the total weight 484,684 pounds.

The total available resources for carrying on the system of exchanges during 1910 amounted to \$36,646.74—\$32,200 of which were appropriated by the Congress and \$4,446.74 were derived from exchange repayments to the Institution.

His Imperial Japanese Majesty's residency-general at Seoul having consented to act as the exchange intermediary between Korea and the United States, the interrupted exchange relations with that country have been resumed.

Under the exchange arrangements entered into in 1898, through the Imperial Academy of Sciences, in Vienna, with the Statistical Central Commission, it has been necessary for the Smithsonian Institution to bear all the expenses for freight on consignments both to and from Vienna. The government of Austria has now signified its willingness to assume its share of the cost of conducting the exchanges between the two countries, and in the future the Institution will, therefore, be relieved of this extra burden upon its resources. In bringing this matter to the attention of the Austrian Government, the Institution has had the assistance of the presidents of the Imperial Academy of Sciences and of the Statistical Central Commission, to both of whom thanks are due for their kind cooperation.

During the past year the Institution discontinued sending exchange packages to correspondents by registered mail. This step was taken with a view to reducing the work in the exchange office and also to relieving the Post-Office Department of the extra expense involved in handling the large amount of registered matter sent out by the exchanges.

There were 975 more correspondents on the records of the exchange office than at the close of last year, the total now being 63,605.

The circular containing the exchange rules has been revised during the year and a new edition printed. For the information of those who may wish to make use of the facilities of the service, the circular is given in full in the report on the exchanges.

German bureau of exchanges.—As has been mentioned in previous reports, the German Government has never undertaken the distribution of exchanges between Germany and the United States, and, in order to conduct the very large interchange of publications between the two countries, it has been necessary for the Smithsonian Institution to maintain a paid agency in Leipzig. During the year 1907, Germany was again approached, through the Department of State, on the subject of the establishment of a governmental bureau of exchanges in that country. It is gratifying to note here that the repre-

sentations of the department through the American ambassador at Berlin, have been given favorable consideration on the part of the German authorities, in connection with the establishment, under the direction of that Government, of the America Institute in Berlin—an institution for the fostering of cultural relations between Germany and the United States. While the Smithsonian Institution has not thus far received definite information of the actual establishment of this institute, it is learned through Dr. Hugo Münsterberg—Harvard exchange professor to the University of Berlin, who is to be the first director of this America institute, and who has taken a very active interest in the whole matter—that it is intended to have the institute assume, as one of its functions, the interchange of publications between Germany and the United States.

NATIONAL ZOOLOGICAL PARK.

The National Zoological Park was established in 1890 “for the advancement of science and the instruction and recreation of the people.” The area covered by the park is 167 acres along the Rock Creek Valley, about 2 miles north of the center of Washington, in a region well adapted by nature for the purpose for which it is used. During the past twenty years improvements have gradually been made as appropriations have permitted by the laying out of driveways and walks and the construction of bridges to render access easy for visitors through connections with the city thoroughfares and with the roadways of Rock Creek Park to the north of the Zoological Park. From year to year likewise the comfort and care of the collections have been improved by the laying out of ponds and yards and the construction of bird cages, bear dens, and buildings suited to the habits of the various animals. Among the improvements of the past year I may mention that six new large cages were built for the lions and other large cats; the antelope house was enlarged by an extension 50 by 50 feet, furnishing 10 additional stalls with commodious yards, and a new entrance to the building; and a suitable pool 47 by 96 feet was made for the sea lions and seals.

There remains, however, much to be done to provide adequate accommodations for the collections that are gradually increasing in number and in value, as well as improved facilities for the great and increasing number of visitors to the park.

To a large extent the animals still have to be kept in temporary quarters, which are insufficient and unsuitable, and are costly to maintain because of the repairs that are constantly required. This is especially true of the temporary building used for birds. The park has a fine series of birds, some of them of great rarity and interest, and they would make a most valuable exhibit if properly housed.

Only a part of the collection can now be shown for lack of room, and it is practically impossible to maintain the birds in a healthy condition when kept in such unsuitable quarters.

The collections in the park were enriched during the year by the addition of a number of East African animals, including five lions, two cheetahs, a leopard, a Grant's gazelle, a wart hog, and several smaller mammals and birds, which were the gift of Mr. W. N. Mc-Millan, of Nairobi; also a pair each of eland and Coke's hartebeest, a Grant's zebra, a water buck, and a *Lophiomys*, which were secured in the same region. These animals were of such interest and value as to render it desirable to send the assistant superintendent of the park to Africa to arrange for their safe transfer to Washington.

ASTROPHYSICAL OBSERVATORY.

The work of the Astrophysical Observatory during the year has brought two important results:

(1) The first result is the establishment of an absolute scale of pyrheliometry within three parts in one thousand as the result of a long series of experiments with various pyrheliometers. The establishment of this scale through Mr. Abbot's standard pyrheliometer has been supplemented by the distribution abroad and at home of several secondary pyrheliometers constructed through a grant from the Hodgkins Fund. The constancy of the scale of these secondary pyrheliometers has been established and it is desirable to compare this scale with those in use elsewhere. It is hoped that finally all pyrheliometric observations will be made on the same scale as that used here.

(2) The second result of the year's work is the agreement within 1 per cent of the "solar-constant" observations obtained by Mr. Abbot at the Smithsonian Mount Whitney station in California at an elevation of 14,500 feet with those obtained simultaneously at the Mount Wilson station in California at an elevation of only 6,000 feet. This determination, in combination with the above-mentioned establishment of an absolute scale of pyrheliometry, gives 1.925 calories per square centimeter per minute as a mean value, for the period 1905-1909, of the rate at which the earth receives heat from the sun when at its mean distance. Determinations made with various forms of apparatus show no systematic difference in this value of the "solar constant." In 1905 this "constant," according to various authorities, was stated at values ranging between 1.75 and 4 calories.

It is improbable that observations would have been continued since 1902 on "solar-constant" work but for a suspected variability of the radiation sent to us from the sun. The laws governing this variability are of extreme importance for utilitarian purposes apart from

their interest to astronomers. While confident of the existence of variations of this value extending over somewhat long periods and of the probability of short-period variations as shown by the observations obtained on Mount Wilson, yet, in order to establish full confidence in the minds of others of this variability of the sun's heat, there is a very pressing need of observations made simultaneously at some other place where they could be made over a longer period than is possible at Mount Whitney. This new station should be so situated that observations could be continued there while the winter rainy season prevents them at Mount Wilson. A station in Mexico would best fulfill such conditions.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The purpose of the International Catalogue of Scientific Literature is to collect and publish in 17 annual volumes a classified index of the current scientific publications of the world. This is accomplished through the cooperation of 32 of the principal countries of the world, which by means of regional bureaus, one in each country, prepare the data necessary to index all scientific publications issued within their domains. The material thus prepared is forwarded to a central bureau in London for publication in the annual volumes.

The various subscribers throughout the world bear the entire cost of the actual printing and publication by the central bureau, but each country taking part in the enterprise bears the expense of indexing and classifying its own publications.

The 17 annual volumes combined contain from 10,000 to 12,000 printed pages. The regional bureau for the United States furnishes yearly about 30,000 citations to American scientific literature, which is between 11 and 12 per cent of the total for the world. The bureau for this country was for several years maintained from the funds of the Smithsonian Institution, but is now supported through annual congressional appropriations.

Millions of dollars are being spent each year in scientific investigations, and many of the foremost men of the day are devoting their entire time to such work. The results of their labors find publicity through some scientific journal, of which there are over 5,000 that are regularly indexed by the various regional bureaus, over 500 of these journals being published in the United States. The titles of hundreds of books and pamphlets are likewise cited in this International Catalogue. There is thus furnished in condensed, accurate, and permanent form a minutely classified index to practically all the scientific literature of the world, for the method of classification actually furnishes a digest of the contents, as well as the usual bibliographical data, for each publication.

It is interesting to mention that a plan for a work of this character was proposed by the Smithsonian Institution as early as 1855, when Secretary Henry, of the Smithsonian Institution, called the attention of the British Association for the Advancement of Science to the great need of an international catalogue of scientific works. In 1867 the Royal Society published its well-known "Catalogue of Scientific Papers," and the Smithsonian Institution from time to time has issued catalogues of the literature of special branches of science. In 1894 the Royal Society invited the governments of the world to send delegates to a conference to be held in London in 1896. At this and the following conferences in 1898 and 1900 a plan was formulated to start the work with a classified subject and author catalogue of all original scientific literature, beginning with January 1, 1901.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX I.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1910:

CONSTRUCTION AND OCCUPATION OF THE NEW BUILDING.

The subjects of greatest concern during the past year have been those connected with the erection and occupation of the new building. By the end of the year essentially all of the building except the interior of the south pavilion and the granite approaches had been structurally finished. The last stones in the approaches, however, were laid toward the end of July, 1910, leaving, at the time of writing this report, only the pavilion, or rotunda, which will require several months more for its completion on account of certain decorative features, though these are neither elaborate nor expensive. The auditorium, which occupies most of the ground floor of the pavilion, is expected to be in readiness by October.

In the general deficiency act passed near the close of the last session of Congress provision was made for the improvement of the grounds immediately about the building. This work includes granolithic roads and walks to the north entrance and along both sides of the building to the east and west entrances, where coal, collections, and supplies are delivered; the grading of the embankment just south of the building and the construction of a narrow service road in the intervening area; the sodding or seeding of all surfaces intended to be kept as lawns; and the readjustment of one of the main roads of the Mall so as to cause it to pass directly in front of the south approaches. These important matters will be attended to by the officer in charge of public buildings and grounds, in whose province they belong.

The pressure for additional space on account of the emptying of the rented buildings and the rapid growth of collections made it imperative to begin the occupation of the new building before its completion. During May and June, 1909, the contents of the rented buildings were carried over and stored on some of the finished floors in the exhibition halls and in one of the open courts. Two months later possession of the third story was obtained from the superintendent of construction, although at that time none of the rooms were provided with doors and temporary expedients had to be resorted to for the protection of such material as was first moved. On November 9, 1909, the Museum accepted control of all parts of the building aside from the south pavilion, and while there was still much work of a minor character in progress, operations were not materially interfered with on that account. The transfer of the collections, laboratories, and workshops has proceeded rapidly, but not as satisfactorily as was hoped for, owing mainly to delays in obtaining furniture, an undertaking of great magnitude, considering that the floor area to be provided for is in the neighborhood of 10 acres.

It may be explained that the first and second floors of the building are designed wholly for exhibition purposes. There is one large exhibition hall

on the ground floor, which also contains the heating and power plant, and the wood and metal work shops. Otherwise, this floor, and the third floor and attic, are allotted to the immense reserve collections in all branches of natural history, the laboratories, preparators' rooms and administrative offices. It is planned with reference to these three floors to use only metal furniture as far as possible, especially for the storage of specimens, since the fire risk is greater in the relatively small closed rooms than in the large exhibition halls, through which a clear view can be had at all times. The danger of fire or of its spread has, however, been reduced to a minimum, first through the use of metal doors supplementing the otherwise fireproof construction, and, second, through a system of alarms, fire plugs and fire extinguishers. While the metal as well as wooden storage cases are made in several styles to meet the requirements of different classes of specimens, the rule of construction along unit lines continues to be followed. The large demand created by the needs of the new building has given rise to a keen competition among manufacturers of steel furniture, and resulted in a quality of workmanship which is highly gratifying.

A certain amount of fireproof storage furniture had been constructed during the year 1908-9, but it was not until the beginning of last year that the larger orders could be placed, and a considerable amount of work was also done in the Museum shops. As it was deemed most important to first complete the furnishing of the working quarters, very little has been done in the matter of exhibition cases, but the requirements of the public halls will be given active consideration during the current year.

Considerably more than half of the natural history collections, both reserve and exhibition, were transferred during the year, and it is expected that the entire moving will be completed before winter. The only exhibition series opened to the public were those referred to below in connection with the National Gallery of Art, but the arrangement of other halls was in progress when the year closed. For the division of plants, the second story of the main part of the Smithsonian building is being fitted up.

From what has been said it will be noted that with the readjustments now in progress all of the collections relating to natural history, including anthropology, but excluding the herbarium, will soon be segregated in the new building, which was specially planned for that branch of the Museum. The installation of the paintings of the National Gallery of Art in the middle wing of the building, as described below, is virtually an intrusion, and it is expected that in due time more appropriate accommodations will be found for this important and rapidly growing department.

The great difference in the amount of space required by each of the respective departments and their branches, dependent upon the size of their collections, has rendered impossible any exact division between them of the floor area of the building, and the claims of each has been decided according to the actual needs. In a general way anthropology has been given the middle part of the building, biology the western side, and geology the eastern side. This division of space extends essentially from the ground floor to the attic, and, in view of the many elevators and stairways provided, the arrangement is not inconvenient. It gives to each of the departments one of the large halls, and, as all of these halls open on the rotunda, a visitor entering by the main doorway may proceed directly to whichever department he desires.

NATIONAL GALLERY OF ART.

Mr. William T. Evans contributed 32 paintings and 1 fire etching to his collection of the works of contemporaneous American artists, which now numbers 114

well-selected examples by 80 painters. This important gift, which is attracting wide attention and receiving the highest commendation, has already done much toward advancing the interests of American art, and it is worthy of mention that one of its canvases was exhibited abroad in the early spring. It should also be stated that during a trip to the Orient Mr. Charles L. Freer secured many choice additions to his collection, still remaining in his custody in Detroit, the formal transfer of which, as the third supplement to the original gift, was made to the Institution in July, 1910.

Early in July, 1909, it became necessary to move the Evans collection from the Corcoran Gallery of Art to the improvised picture gallery in the older Museum building, and this in turn required the temporary retirement from public view of many of the paintings which had previously been installed there. The importance of having the entire collection kept together and on exhibition, however, led to an arrangement for its maintenance in the new building, pending the time when a more appropriate home can be found for the department of the fine arts. The location selected was the central skylighted part of the middle hall, which is 50 feet wide and has been utilized to a length of about 130 feet. This area was inclosed with screen walls of a suitable character for hanging paintings and was divided into 7 rooms of varying size. Here all of the paintings belonging to the gallery, together with many loans, were assembled in time to have an informal opening on the 17th of March, 1910, which was largely attended. Some of the more interesting ethnological groups and historical exhibits were also installed for the same occasion in the surrounding parts of the hall and adjacent ranges, and the first visitors to the new building were, therefore, given the opportunity to judge of its advantages for exhibition purposes. At the close of the year preparations had been made for extending the limits of the gallery so as to include the entire space below the skylight.

ART TEXTILES.

With the removal of the paintings from the gallery in the older Museum building and of the large screens except the one at the east end, this entire hall became available for the collection of art objects commenced two years ago at the suggestion of Mrs. James W. Pinchot, who has continued to give her personal attention to its growth and arrangement. Consisting fundamentally of laces, it comprises other art textiles and fabrics such as embroideries, tapestries, brocades, and velvets; and also fans, enamels, porcelains, silver work, ivory carvings, jewelry, etc. Besides many loans there were two important donations during the year. One was from Mrs. Pinchot and consisted of 61 pieces of lace, purchased abroad expressly for the collection and with a view to its needs. The other was from Miss Anna R. Fairchild, and comprised 12 pieces of lace and 7 fans, formerly belonging to the late Miss Julia S. Bryant, in whose memory they were presented. The laces are of several varieties, mostly of large size, dating back to the seventeenth century, and are of great beauty and value. Just before the close of the year additional cases were provided and the entire collection was rearranged. It is now one of the most attractive features in the Museum.

COMMEMORATIVE TABLET.

It is especially pleasing to note the acquisition of a large bronze tablet, interesting both historically and artistically, executed by the sculptor, Isidore Konti, for the Hon. Truxton Beale, who has recognized the National Museum as a fitting place for its installation. It symbolizes an act of heroism during the war with Mexico, by which the two participants, whose figures appear in relief on the tablet, namely, Passed Midshipman (afterwards General) Edward F. Beale

and Kit Carson, obtained succor for a band of American soldiers surrounded by the enemy. This tablet, which measures 11 feet high by 7 feet wide, was erected in the north entrance hall of the new building, and unveiled, with simple ceremonies, on May 31, 1910.

ADDITIONS TO THE COLLECTIONS.

The total number of specimens received during the year was approximately 970,698, of which 933,998 were zoological and botanical, 17,979 were geological and paleontological, and 18,721 belonged to the several divisions comprised in the department of anthropology. The unprecedented record for biology resulted from the transfer of a special large collection from one of the government departments, as explained below. While North America was, as usual, most extensively represented in the additions, the accessions from abroad were exceptionally numerous and valuable, and in a notable degree furnished material for important contributions to science.

The most noteworthy accession was that received from the Smithsonian African Expedition under the direction of Col. Theodore Roosevelt, who was accompanied by his son, Mr. Kermit Roosevelt, and, on the part of the Institution, by Dr. Edgar A. Mearns, U. S. Army, Mr. Edmund Heller, and Mr. J. Alden Loring. This expedition, which was entirely financed from private sources, reached Mombasa on April 21, 1909, spent eight months in British East Africa, and thence proceeded through Uganda and down the White Nile to Khartum, where it arrived on March 14, 1910. Field work was energetically prosecuted in all parts of the region visited and ample notes were made. The resultant collection, sent in several installments, reached Washington in excellent condition, and constitutes the largest and most important single gift of natural history objects ever received by the Museum. A preliminary census indicates that it comprises about 4,897 mammals, 4,000 birds, 2,000 reptiles and batrachians, and 500 fishes, besides large numbers of mollusks, insects, crustaceans, and other invertebrates, and several thousand plants. The series of large and small mammals from East Africa is, collectively, probably more valuable than is to be found in any other museum in the world, its importance depending not so much on the number of new forms as on the fact that it affords an adequate basis for a critical study of the mammal fauna of East Africa and the establishment or rejection of the large number of forms which have been described, especially in recent years, from insufficient material. The series of birds, reptiles, and plants are also exceedingly valuable, and the material representing other groups is certain to furnish interesting results when studied.

An exploration of certain parts of Java by and at the expense of Mr. Owen Bryant, of Cohasset, Massachusetts, assisted by Mr. William Palmer, of the Museum staff, resulted in the acquisition of a large and valuable collection, in which mammals and birds figure most prominently, though reptiles, insects, and marine invertebrates are extensively represented. Dr. William L. Abbott presented an important collection of ethnological objects, together with interesting specimens of mammals, birds, and reptiles, obtained by him in Borneo. Nearly 400 specimens, representing 85 species of birds from the Polynesian Islands, were received as a gift from Mr. Charles H. Townsend, of New York, by whom they were collected several years ago.

The transfers made by the United States Bureau of Fisheries, consisting mainly of material which had been studied and described, and containing a large number of types, were of great value. Of fishes there were about 30,000 specimens, of marine invertebrates about 8,000 specimens, and of reptiles and batrachians about 600 specimens. Except for many fishes from the fresh waters of the United States, the collections were derived almost wholly from the explorations of the steamer *Albatross* in different parts of the Pacific Ocean.

An extensive and very valuable series of crustaceans from the expedition of the British ship *Sealark* to the western Indian Ocean in 1905, and smaller series from the explorations of the French ship *Travailleur* and the German ship *Talisman* in the eastern Atlantic Ocean, were presented to the Museum in return for services in working up the respective collections for publication.

The Bureau of Entomology of the Department of Agriculture transferred to the Museum a most extensive and noteworthy collection, which has been in course of building up for a number of years in connection with investigations on insects injurious to forest trees. It comprises not less than 800,000 specimens, mainly beetles of the family *Scotyidae*, and remains in charge of Dr. A. D. Hopkins, of the Bureau, who has been designated as its custodian in the Museum.

The division of plants received over 33,000 specimens, including about 10,000 obtained during an expedition under the associate curator, Dr. J. N. Rose, to the southwestern United States and western Mexico; the material collected by the Smithsonian African Expedition; exchanges from the Philippine Islands, and transfers from the Department of Agriculture.

In geology and mineralogy some interesting specimens from different parts of the world were secured. The accessions in invertebrate paleontology were not only extensive but also of special importance, having been mainly the results of field work conducted during the year under the auspices of the Institution, the Museum, and the Geological Survey, accompanied by stratigraphic observations, and furnishing material for investigations of exceptional value. The largest and most noteworthy collections consisted of Cambrian fossils obtained in Alberta, Canada, by the Secretary, and in Utah and Manchuria, China, by others under his direction. Next should be mentioned Ordovician and Silurian fossils from the Ohio Valley, Utah, and the island of Anticosti, Canada, in part collected by the curator of the division and in part secured by transfer and exchange. Interesting contributions were series of Tertiary fossils from North Carolina and the State of Washington.

A number of remains of rare fossil vertebrates, some in excellent condition for mounting for exhibition, and valuable additions to the collection of mammalian remains from the Fort Union beds of Sweet Grass County, Montana, were obtained in connection with explorations by the Geological Survey and the Museum. The types and figured specimens of Cretaceous plants from New York and New England recently described and published by the Geological Survey constituted the principal acquisition in paleobotany.

Prominent among the accessions in ethnology was a large collection of objects illustrative of the Kanakas of Hawaii, gathered during a long period of years by Dr. N. B. Emerson, of Honolulu, and purchased by the Government for exhibition at the Alaska-Yukon-Pacific Exposition. The most notable of many additions in prehistoric archeology were two collections from North America and one from South America. The former resulted from excavations by Dr. J. W. Fewkes, first at the "Cliff Palace," Mesa Verde National Park, Colorado, for the Department of the Interior, and subsequently at the ruins of the Marsh Pass region, Arizona, for the Bureau of American Ethnology. The latter represents the ancient peoples of Argentina and was obtained by exchange.

Through the courtesy and generosity of the officials of the Metropolitan Museum of Art in New York Dr. Aleš Hrdlička was enabled to visit the excavations which that museum has for some time been conducting in Egypt and to secure from the tombs as they were uncovered several hundred remains of ancient Egyptians, which were carefully labeled and prepared for shipment under his personal supervision. The value of this collection, which is still to be worked up, is greatly enhanced by the fact that every specimen is well identified chronologically.

The technological collections were increased along many lines, the most important additions having been of firearms, including a number of historically interesting pieces, for which the Museum was chiefly indebted to the War Department. Also worthy of mention were series of sun dials and of watch and chronometer movements and the original machine, long in use, by which complete pins were first manufactured automatically.

The division of history was greatly enriched. The bequest of Prof. Simon Newcomb to the nation for deposit in the Museum of many personal memorials comprised, besides his uniform and sword as a rear-admiral in the navy, gold and bronze medals, vases, including a large and fine example in jasper presented by the Emperor of Russia, and 118 diplomas and announcements of honors conferred on this distinguished astronomer by universities and other learned bodies for eminence in science. Among the gifts and loans were personal relics of Admiral Farragut and Rear-Admiral Charles Wilkes, and a number of pieces of china bearing the insignia of the Society of the Cincinnati, made in China in 1790 for David Townsend, of Massachusetts.

MISCELLANEOUS.

Of duplicate specimens from the collections of the various divisions, about 6,000 were distributed to educational establishments in different parts of the country, while about 24,000 were used in making exchanges with other institutions and with individuals, whereby much valuable new material was acquired. The number of specimens sent to specialists for study in behalf of the Museum or of work in progress for other purposes was about 16,000.

The record of visitors to the public halls showed an average attendance, the total number of persons who entered the older Museum building during the year having been about 229,000. It is to be expected that the attendance at the new building when its exhibition collections have been fully arranged will be much greater than this, but not until Sunday opening has been effected, a step anticipated in the near future, can the Museum hope to meet its manifest obligations in popular education.

The publications of the year, all but one of which were descriptive of material in the collections, comprised the annual or administrative report for 1909, one volume of Proceedings, one of Contributions from the National Herbarium, 8 bulletins, and 55 separate papers belonging to three uncompleted volumes.

Because of the insufficient funds provided for the purchase of books the library of the Museum still serves very inadequately the purposes for which it is maintained, the classification of the collections, and important work is often much hindered on this account. At the close of the year it contained 38,300 volumes and 61,858 unbound papers.

Mr. William H. Holmes, who has served as Chief of the Bureau of American Ethnology since 1902, returned to the Museum in January to again take up the duties of head curator of the department of anthropology. It is with deep regret that I announce the deaths, at advanced ages, of two of the honorary associates of the Museum, Dr. Charles A. White and Dr. Robert E. C. Stearns, once active members of its staff, both of whom became widely known through their important contributions to science during many years, the former especially in paleontology, the latter in zoology.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary, in Charge of U. S. National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

AUGUST 27, 1910.

APPENDIX II.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to submit the following report of the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1910, conducted in accordance with the act of Congress approved March 4, 1909, authorizing the continuation of ethnological researches among the American Indians and the natives of Hawaii, under the direction of the Smithsonian Institution, and in accordance with the plans of operations approved by the Secretary on June 1, 1909, and January 7, 1910.

During the first half of the fiscal year the administration of the Bureau was under the immediate charge of Mr. William H. Holmes, who, on January 1, 1910, severed his official connection with the Bureau in order to resume his place as head curator of anthropology in the United States National Museum and to become curator of the National Gallery of Art, as well as to enable him to take advantage of the facilities afforded by the change for publishing the results of his various archeological researches. Mr. F. W. Hodge was designated on the same date to assume the administration of the Bureau under the title "ethnologist in charge."

In view of the approaching change and of the necessity for devoting much of his time to affairs connected with the Department of Anthropology of the National Museum and the National Gallery of Art and the administration of the Bureau, Mr. Holmes found it impracticable to give attention to field research during the remainder of 1909. Good progress was made in the preparation of the Handbook of American Archeology, to which he had devoted much attention during the year and to which reference has been made in previous reports.

The systematic ethnological researches of the Bureau were continued as in previous years with the regular force of the Bureau, consisting of eight ethnologists, increased to ten toward the close of the year by the appointment of two additional members of the staff, and finally decreased by the death of one member. In addition, the services of several specialists in their respective fields were enlisted for special work, as follows:

Prof. Franz Boas, honorary philologist, with several assistants, for research in the languages of the American aborigines, particularly with the view of incorporating the results in the Handbook of American Indian Languages.

Miss Alice C. Fletcher and Mr. Francis La Flesche, for continuing the revision of the proofs of their monograph on the Omaha Indians, to be published as the "accompanying paper" of the Twenty-seventh Annual Report.

Miss Frances Densmore, for researches in Indian music.

Mr. J. P. Dunn, for studies of the tribes of the Algonquian family residing or formerly resident in the Middle West.

Rev. Dr. George P. Donehoo, for investigations in the history, geography, and ethnology of the tribes formerly living in western Pennsylvania and south-western New York, for incorporation in the Handbook of American Indians.

Mr. William R. Gerard, for studies of the etymology of Algonquian place and tribal names and of terms that have found their way into the English language, for incorporation in the same work.

Prof. H. M. Ballou, in conjunction with Dr. Cyrus Thomas, for bibliographic research in connection with the List of Works Relating to Hawaii, in course of preparation for publication.

The systematic ethnological researches by members of the regular staff of the bureau are summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, when administrative work permitted devoted his attention almost exclusively to the editing of the Handbook of American Indians (pt. 2), which was so far advanced toward completion at the close of the fiscal year that it seemed very probable the volume would be ready for distribution within about six months. As the work on part 2 was in progress, advantage was taken of the opportunity afforded by the necessary literary research in connection therewith to procure new data for incorporation in a revised edition of the entire work, which it is proposed to issue as soon as the first edition of part 2 has appeared. The demand for the handbook is still very great, many thousands of requests having been received which could not be supplied owing to the limited edition.

With the exception of a brief trip, Mr. James Mooney, ethnologist, remained in the office throughout the entire fiscal year, occupied chiefly in the elaboration of his study of Indian population, with frequent attention to work on the Handbook of American Indians, and to various routine duties, especially those connected with supplying information to correspondents. The investigation of the former and present population covers the entire territory north of Mexico, from the discovery to the present time, and involves the close examination of a great body of literature, particularly documentary records of the various colonies and of the official reports of French and Spanish explorers and commanders, together with such special collections as the Jesuit Relations and the annual Indian reports of the United States and Canadian governments from the beginning. It is also necessary, first, to fix and differentiate the tribe, and then to follow the wasting fortunes of each tribe and tribal remnant under change of name and habitat, further subdivision, or new combination, to the end. For better handling, the whole territory has been mapped into fifteen sections, each of which has its own geographic and historical unity, and can thus be studied separately. The investigation includes a summary of the Indian wars, and notable epidemics within the same region from the discovery. No similar investigation has ever before been attempted, even the official Indian reports being incomplete as to identity of tribes and number of Indians not directly connected with agencies.

In January, 1910, by request of those organizations, Mr. Mooney was designated to represent the Bureau of American Ethnology at the joint meeting of the Mississippi Valley Historical Association and the Nebraska State Historical Society, held at Lincoln, Nebraska, and delivered several addresses, with particular reference to the utilization of the methods and results of the Bureau in local ethnologic and historical research.

At the request of the Secretary of the Interior, Dr. J. Walter Fewkes, ethnologist, continued the excavation and repair of the prehistoric ruins in the Mesa Verde National Park, in southern Colorado, begun in the previous year. Doctor Fewkes commenced work on Cliff Palace in May, 1909, and completed the excavation and repair of this celebrated ruin in August. He then proceeded to northwestern Arizona, and made a reconnoissance of the Navaho National Monument, visiting and studying the extensive cliff and other ruins of that section, knowledge of the existence of which he had gained many years ago during his ethnological researches among the Hopi Indians. At the close of this investigation Doctor Fewkes returned to Washington and prepared for the Secretary of the Interior a report on the excavation and repair of Cliff Palace, which was published by the Department of the Interior in November. A more

comprehensive illustrative report on the same ruins, giving the scientific results of Doctor Fewkes's studies during the progress of the excavation of Cliff Palace, was prepared for publication as Bulletin 51 of the Bureau of American Ethnology and is now in press, forming a companion publication to his description of Spruce-tree House, published earlier in the fiscal year as Bulletin 41. Doctor Fewkes prepared also a report on his preliminary researches in the Navaho National Monument, which is in type and will be published as Bulletin 50. During the remainder of the winter and spring, Doctor Fewkes was occupied in the preparation of a monograph on Casa Grande, an extensive ruin in Arizona, excavated and repaired by him during previous years. He gave some time also to the elaboration of an account of antiquities of the Little Colorado Valley, a subject to which he has devoted considerable study. This work was interrupted in May, 1910, when he again departed for the Navaho National Monument for the purpose of continuing the archeological studies commenced during the previous field season. At the close of the year Doctor Fewkes was still at work in this region.

Owing to the large amount of material in process of publication as a result of his own researches or assigned to him by reason of his special knowledge of the subjects involved, Dr. John R. Swanton, ethnologist, devoted the year entirely to office work. Much of this time was spent in proof reading (1) Bulletin 43, *Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico*, the result of personal field investigations and historical study; as well as in proof reading (2) Bulletin 46, a *Choctaw Dictionary*, by the late Cyrus Byington; and (3) Bulletin 47, on the *Biloxi Language*, by the late J. Owen Dorsey, arranged and edited by Doctor Swanton, who incorporated therein the related Ofo material collected by him in 1908 and added a brief historical account of the Ofo tribe. In connection with his researches on the Southern tribes or tribal remnants, Doctor Swanton has revised and rearranged the Attacapa, Chitimacha, and Tunica linguistic material collected by the late Dr. Albert S. Gatschet and has put it almost in final form for the press. With the aid of several texts recorded in 1908, Doctor Swanton has spent some time in studying the Natchez language, preparatory to further investigations among the survivors of this formerly important group, now in Oklahoma. The remainder of his energies has been devoted chiefly to researches pertaining to the Creek Confederacy, with the aid of books and documents in the library of the Bureau and in the Library of Congress, in anticipation of field investigation among the Creek tribes to be undertaken, it is expected, later in 1910.

Mrs. M. C. Stevenson, ethnologist, continued her researches among the Pueblo tribes of the Rio Grande Valley, New Mexico, giving special attention to the Tewa group. As during the previous year her studies were devoted chiefly to the pueblo of San Ildefonso, which offers better facilities for ethnologic investigation than the other Tewa villages, although her inquiries were extended also to Santa Clara and Nambe. Owing to the extreme conservatism of the Tewa people, Mrs. Stevenson found great difficulty in overcoming their prejudices against the study of the esoteric side of their life, but with patience she succeeded finally in gaining the warm friendship of many of the more influential headmen, and by this means was enabled to pursue a systematic study of the Tewa religion, sociology, and philosophy. Like most Indians, the Tewa are so secretive in everything that pertains to their worship that one not familiar with their religious life is readily misled into believing that the ceremonies held in the public plazas of their villages which, with few exceptions, are more Mexican than Indian in outward character, constitute the sole rites of these people, whereas it has been found that the Tewa adhere as strictly

to many of their ancient customs as before white men came among them, although some of their ceremonies are now less elaborate than they were in former times.

While the creation myth of the San Ildefonso Indians differs somewhat from that of the Zúñi and of other Pueblo tribes, it is the same in all essentials. According to their belief they were created in an undermost world, and passed through three other worlds before reaching this one. The tribe is divided into the Sun or Summer, and the Ice or Winter people, the former having preceded the latter in their advent into this world, and their final home was reached on the western bank of the Rio Grande almost opposite the present pueblo. This place is marked by an extensive ruin.

Every mountain peak, near and far, within sight of San Ildefonso is sacred to the Tewa people, and they make pilgrimages at prescribed intervals to lofty heights far beyond the range of their home. The names of these sacred mountains, with a full description of each, were procured.

The philosophy of all the Pueblos is closely related in a general way, yet there are marked differences in detail. Although Mrs. Stevenson has penetrated the depths of the Tewa philosophy, she has not been able to discover any distinctive features, it being a composite of Zúñi, Sia, and Taos beliefs. The great desire of all these people, and the burden of their songs and prayers, is that rain, which in their belief is produced by departed ancestors working behind the cloud-masks in the sky, should come to fructify the earth, and that they may so live as to merit the beneficence of their deities. The entrance to this world is believed to be through a body of water, which the Tewa of San Ildefonso declare existed near their village until certain Zúñis came and spirited the water away to their own country. Further studies, no doubt, will shed more light on these interesting beliefs, and render clearer the origin and relations of Tewa and Zúñi concepts.

There are but two rain priests among the Tewa of San Ildefonso: one pertaining to the Sun people, the other to the Ice people, the former taking precedence in the general management of tribal affairs. The rain priest of the Sun is the keeper of the tribal calendar and is the supreme head of the Sun people. The governor of San Ildefonso, who is chosen virtually by the rain priest of the Sun people, is elected annually, and has greater power than that accorded a Zúñi governor. The war chief, whose religious superior is the war priest, who holds the office during life, is also elected annually, and also is a person of great power. There are three kivas, or ceremonial chambers, at San Ildefonso, one belonging to the Sun people, another to the Ice people, and one used jointly for certain civic gatherings, for rehearsal of dances, and for other purposes. The religion of the Tewa of San Ildefonso consists in worship of a supreme bisexual power and of gods anthropic (embracing celestial and ancestral) and zoic, the latter especially associated with the sacred fraternities. The fundamental rites and ceremonies of these fraternities are essentially alike among all the Pueblos. Their theurgists are the great doctors, whose function is to expel disease inflicted by witchcraft, and those of San Ildefonso have as extensive a pharmacopoeia as the Zúñi theurgists. The belief of the Tewa in witchcraft is intense, and is a source of great anxiety among them. Accused wizards or witches are tried by the war chief.

Many of the San Ildefonso ceremonies associated with anthropic worship are identical with those of Taos, while others are the same as those observed by the Zúñi, although neither the ritual nor the paraphernalia is so elaborate. Some of the songs used in connection with the dances at San Ildefonso are in the Zúñi tongue. It is to be hoped that further comparative study among these people will reveal to what extent the ceremonies have been borrowed, like that of the

Koh'-kok-shi of the Zúñi, which is asserted to have been introduced by way of Santo Domingo generations ago by a Laguna Indian who had visited Zúñi.

Mrs. Stevenson devoted much attention to a study of Tewa games, finding that those regarded as of the greatest importance to the Zúñi in bringing rain have been abandoned by the San Ildefonso people. The foot race of the latter is identical with that of Taos, and is performed annually after the planting season. As complete a collection and study of the Tewa medicinal plants were made as time permitted.

The material culture of the Tewa also received special attention. Weaving is not an industry at San Ildefonso, the only weaver in the tribe being a man who learned at Laguna to make women's belts. Basketry of various forms is made of willow. The San Ildefonso people, like other Pueblos, have deteriorated in the ceramic art, and they have now little or no understanding of the symbols employed in pottery, except the common form of cloud and rain. Their method of irrigation is the same as that observed by the neighboring Mexicans, who, having acquired extensive tracts of land from the San Ildefonso land grant, work with the Indians on the irrigating ditches for mutual benefit. The San Ildefonso people raise a few cattle and horses, but no sheep. Much of their land is owned in severalty, and their chief products are corn, wheat, and alfalfa. The women raise melons, squashes, and chile.

While marriages, baptisms, and burials are attended with the rites of the Catholic Church, a native ceremony is always performed before the arrival of the priest. While their popular dances of foreign admixture are sometimes almost depleted by reason of intoxication, no such thing happens when a purely Indian ceremony is performed, for the dread of offending their gods prevents them from placing themselves in such condition as not to be able to fulfill their duty to the higher powers.

Mrs. Stevenson not only prepared the way for a close study of the Tewa of Nambe by making a warm friend of the rain priest of that pueblo, but found much of interest at the Tigua pueblos of Taos and Picuris, especially in the kivas of the latter village. It was in an inner chamber of one of the Picuris kivas that the priests are said to have observed their rites during the presence of the Spaniards. Another interesting feature observed at Picuris was the hanging of scalps to a rafter in an upper chamber of a house, the eastern side of which was open in order to expose the scalps to view. At Picuris the rain priests, like those of Zúñi and San Ildefonso, employ paddle-shaped bone implements (identical with specimens, hitherto undetermined, found in ruins in the Jemez Mountains and now in the National Museum) for lifting the sacred meal during their rain ceremonies.

During a visit to Taos Mrs. Stevenson obtained a full description of an elaborate ceremony performed immediately after an eclipse of the sun.

After her return to Washington, in February, Mrs. Stevenson devoted attention to the preparation of a paper on the textile fabrics and dress of the Pueblo Indians. For comparative studies it was necessary to review a large number of works on the general subject and to examine collections pertaining thereto. Mrs. Stevenson also prosecuted her studies of medicinal and edible plants.

During the entire fiscal year Mr. J. N. B. Hewitt, ethnologist, was engaged in office work devoted chiefly to studies connected with the Handbook of American Indians, especially part 2. A number of articles designed for this work had been prepared by other collaborators, but were recast by Mr. Hewitt in order to embody in them the latest views regarding their subject-matter. Mr. Hewitt also conducted extensive researches into the history of the Indians of the Susquehanna River during the seventeenth century, and their relations with

neighboring peoples, resulting in the discovery that a number of important tribes were designated by the names Susquehanna, Conestoga or Andastes, Massawomek, Erie, Black Minquas, Tehotitachsae, and Atrakwayeronon (Akhrakwayeronon). It is proposed to incorporate this material into a bulletin, with several early maps, in order to make it available to students of the history of the Indians of Pennsylvania and New York, and their relations with white people. Mr. Hewitt also devoted about two months to the translation of Onondaga native texts relating to the New Year ceremony, and began work on the classification of the late Jeremiah Curtin's Seneca legends, with a view of preparing them for publication by the Bureau.

As custodian of the linguistic manuscripts in the Bureau archives, Mr. Hewitt spent considerable time in installing this material, comprising 1,704 items, on its removal from the former quarters of the Bureau to the Smithsonian building. He was frequently occupied also in receiving manuscripts and in searching and charging those required by collaborators either for temporary or for prolonged use. Much time and labor were also devoted by Mr. Hewitt to the collection and preparation of data of an ethnological character for replies to correspondents.

Dr. Cyrus Thomas, ethnologist, while not engaged in revising the proofs of Bulletin 44, *Indian Languages of Mexico and Central America and their Geographical Distribution*, prepared by him with the assistance of Doctor Swanton, devoted his attention to the elaboration of the *List of Works Relating to Hawaii*, with the collaboration of Prof. H. M. Ballou. Toward the close of the fiscal year, this work having been practically finished, Doctor Thomas undertook an investigation of the relations of the Hawaiians to other Polynesian peoples, but unfortunately this work was interrupted in May by illness which terminated in his death on June 26. Doctor Thomas had been a member of the Bureau's staff since 1882 and, as his memoirs published by the Bureau attest, one of its most industrious and prolific investigators.

As the result of a special civil-service examination held March 3, 1910, the staff of the Bureau was increased by the appointment, as ethnologists, of Dr. Truman Michelson on June 1 and of Dr. Paul Radin on June 3.

Doctor Radin immediately made preparations to resume his researches among the Winnebago Indians in Nebraska and Wisconsin, commenced under personal auspices three years before, and by the close of the fiscal year was making excellent progress toward completing his studies of this important Siouan group.

About the same time Doctor Michelson departed for Montana with the purpose of studying the Blackfeet, Northern Cheyenne, and Northern Arapaho, Algonquian tribes, whose relations to the other members of the stock are not definitely known. It is the intention that Doctor Michelson obtain a view of the relations of the Algonquian tribes generally, in order that he may become equipped for an exhaustive study of the Delaware and Shawnee tribes, so important in the colonial and later history of the United States. Doctor Michelson reached the Blackfoot country on June 16, and within a few days had recorded a considerable body of ethnological, mythological, and linguistic material relating to the Piegan division.

The special researches of the Bureau in the linguistic field were conducted, as in the past, by Dr. Franz Boas, honorary philologist, whose work during the fiscal year resulted in bringing nearly to completion the first volume of the *Handbook of American Indian Languages*. The whole matter is in type, 735 pages were in practically final form at the close of the fiscal year, and the sketches of only three languages remained to be revised before paging. Besides the purely technical work of revising and proof reading, the most important work on the

first volume was a thorough revision of the Algonquian sketch by Dr. William Jones, who had planned to make certain additions to the manuscript, but whose unfortunate death in the Philippine Islands left his researches on the Algonquian languages incomplete. The revision was assigned to Dr. Truman Michelson, who made a careful comparison between Doctor Jones's description of the language and his published collection of texts.

Considerable progress was made on the preparation of the second volume of the Handbook of American Indian Languages. Owing to the increase in size of a number of the original sketches, which was due to the lapse of time since they were first recorded, the first volume had increased so much in size that it became necessary to relegate the Takelma to the second volume.

At the beginning of the fiscal year Dr. Leo J. Frachtenberg carried on investigations under the direction of Doctor Boas among the Coos Indians of Oregon. He succeeded in collecting a considerable body of texts from the survivors, and at the same time revised the material collected several years ago by Mr. H. H. St. Clair, 2d. Doctor Frachtenberg completed his studies of the grammar of the language, and the manuscript of this sketch for the second volume was delivered and is partly in type. Toward the end of the year Doctor Frachtenberg made preparatory studies on the Alsea language of Oregon, based on manuscript texts collected a number of years ago by Prof. Livingston Farrand on an expedition due to the generosity of the late Mr. Henry Villard. The completion of the ethnological research work among the Alsea has been provided for by a contribution of funds by Mrs. Villard, which will make it possible to complete also the linguistic investigation of the tribe during the field season of 1910. In June Doctor Frachtenberg visited two survivors of the Willpah tribe who were said to remember the language, but unfortunately only about 300 words could be obtained, and practically no grammatical forms.

Further preparatory work on the second volume of the Handbook of American Indian Languages was carried on by Mr. James Teit, who elucidated the details of the distribution of the Salish dialects of the State of Washington. Part of this work was supported by the generosity of Mr. Homer E. Sargent, of Chicago.

The special researches in Indian music were continued in behalf of the Bureau by Miss Frances Densmore, who has done so much toward preserving the vanishing songs of the Indians. The principal new phase that has arisen in Miss Densmore's work is the importance of the rhythmic unit in Chippewa songs. Her observations indicate that the rhythmic phrase is the essential element of the song; indeed Miss Densmore is inclined to think that the first idea of the song may be a mental rhythm assuming the form of a short unit, and that its expression follows the overtones of a fundamental which exists somewhere in the subconsciousness of the singer. The tabulated analyses show that 99 out of 180 songs to appear in Bulletin 45 (in press) begin on the twelfth or fifth, and 34 begin on the octave—a total of 133 out of 180 beginning on the principal overtones. Of 180 songs, 120 end on the tonic, and yet the tonic does not usually appear until near the close of the song.

Melodic phrases are seldom recurrent. In the oldest songs the words are sung between repetitions of the rhythmic unit, and have a slight rhythm and small melody progressions. Rhythm varies less often than earlier words or melody in repetition, especially when the rhythm is comprised in a definite unit. All these facts emphasize the importance of the rhythm, and also have a bearing on the problem of the development of primitive music, which it is designed to treat in a practical rather than in a theoretical way.

The independence of voice and drum noted by Miss Densmore in previous studies was further shown by the data collected during the year; also the prominence of the descending interval of the minor third, and the marked use of overtones in the choice of melodic material.

The songs collected comprise a group of 40 secured at Ponima, a remote village on the Red Lake Reservation, Minnesota, and the series of war songs which Miss Densmore is now completing and which she expects to finish before the close of the calendar year. It is the intention to combine the analyses of these with the analyses contained in Bulletin 45 of the Bureau, always bringing forward previous work, in order that the results may be cumulative. It is Miss Densmore's desire, before leaving the Chippewa work, to analyze about 500 songs collected from a representative number of localities, as the data derived from systematic analyses of that number of songs should be a safe basis for what might be termed a scientific musical study of primitive song.

Miss Alice C. Fletcher and Mr. Francis La Flesche have continued the proof revision of their monograph of the Omaha Indians to accompany the Twenty-seventh Annual Report, a part of which was in page form at the close of the fiscal year.

Mr. J. P. Dunn pursued his studies of the Algonquian tribes of the Middle West under a small allotment of funds by the Bureau, but comparatively little progress was made, as it was found advisable to hold the investigations somewhat in abeyance until two important manuscript dictionaries—one of the Peoria, the other of the Miami language—known to exist, could be carefully examined, with a view of avoiding repetition of effort. Mr. Dunn was enabled, however, to revise and annotate completely a text in the Miami and Peoria dialects recorded by the late Doctor Gatschet.

PUBLICATIONS.

The editorial work of the Bureau was conducted by Mr. J. G. Gurley, who from time to time, as pressure required, had the benefit of the aid of Mr. Stanley Searles. All the publications of the Bureau have passed under Mr. Gurley's editorial supervision, with the exception of part 2 of Bulletin 30 (Handbook of American Indians), which has been in special charge of Mr. F. W. Hodge, editor of the work, assisted by Mrs. F. S. Nichols. In order to facilitate progress in the publication of the Handbook of American Indian Languages, the editor thereof, Dr. Franz Boas, assumed entire charge of the proof reading in January, thus enabling Mr. Gurley to devote more time to the numerous other publications passing through press.

In all, the manuscripts of seven publications—Bulletins 37, 44, 45, 48, 49, 50, and 51—were prepared for the Government Printing Office, while proof reading was continued on nine publications—the Twenty-seventh Annual Report and Bulletins 30 (part 2), 38, 39, 40 (part 1), 41, 43, 46, and 47, which were in hand in various stages of progress at the beginning of the fiscal year. The number of publications issued was five—Bulletins 38, 39, 41, 48, and 49. The Twenty-seventh Annual Report is in type and a substantial beginning was made toward putting it into page form. The proof of the "accompanying paper" on the Omaha Indians, by Miss Fletcher and Mr. La Flesche, was critically read by the authors and is in condition to be completed in a few months. Bulletins 37 and 43 are practically ready for the bindery, and Bulletins 40 (part 1) and 45 are nearly as far advanced. Bulletin 44 had the benefit of revision by the principal author, Dr. Cyrus Thomas, shortly before his death, and a second galley proof was received. The first galley proof of Bulletins 50 and 51 was placed

in the hands of the author, Doctor Fewkes, for revision. Owing to the condition of the Bureau's allotment for printing and binding, as reported by the Public Printer, and on his suggestion that the work for the fiscal year be curtailed, Bulletins 46 and 47 were not carried beyond the first galley stage. Appended is a list of the publications above mentioned, with their respective titles and authors:

Twenty-seventh Annual Report (1905-6), containing accompanying paper entitled "The Omaha Tribe," by Alice C. Fletcher and Francis La Flesche.

Bulletin 37. Antiquities of Central and Southeastern Missouri, by Gerard Fowke.

Bulletin 38. Unwritten Literature of Hawaii, by Nathaniel B. Emerson, A. M., M. D.

Bulletin 39. Tlingit Myths and Texts, by John R. Swanton.

Bulletin 40. Handbook of American Indian Languages (Part 1), by Franz Boas.

Bulletin 41. Antiquities of the Mesa Verde National Park: Spruce-tree House, by J. Walter Fewkes.

Bulletin 43. Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico, by John R. Swanton.

Bulletin 44. Indian Languages of Mexico and Central America, and their Geographical Distribution, by Cyrus Thomas, assisted by John R. Swanton.

Bulletin 45. Chippewa Music, by Frances Densmore.

Bulletin 46. Choctaw Dictionary, by Cyrus Byington, edited by John R. Swanton.

Bulletin 47. A Dictionary of the Biloxi Language, accompanied by thirty-one texts and numerous phrases, by James Owen Dorsey; arranged and edited by John R. Swanton.

Bulletin 48. The Choctaw of Bayou Lacombe, St. Tammany Parish, Louisiana, by David I. Bushnell, jr.

Bulletin 49. List of the Publications of the Bureau of American Ethnology.

Bulletin 50. Preliminary Report on a Visit to the Navaho National Monument, Arizona, by Jesse Walter Fewkes.

Bulletin 51. Antiquities of the Mesa Verde National Park: Cliff Palace, by Jesse Walter Fewkes.

The preparation of the illustrations for the publications of the Bureau and of photographs of Indian types continued in charge of Mr. DeLancey Gill, illustrator, assisted by Mr. Henry Walther. This material consists of 97 Indian portraits from life, 121 negatives and 29 drawings for the Bureau publications, 15 copies of negatives, and 676 photographic prints. As in the past, special attention was devoted to the photographing of the members of visiting deputations of Indians, since by this means favorable opportunity is afforded for permanently portraying the features of many of the most prominent Indians belonging to the various tribes.

LIBRARY.

The library of the Bureau continued in immediate charge of Miss Ella Leary, librarian. During the year about 1,500 volumes and about 600 pamphlets were received and catalogued; and about 2,000 serials, chiefly the publications of learned societies, were received and recorded. One thousand five hundred volumes were sent to the bindery, and of these all but 600 had been bound before the close of the fiscal year. In addition to the use of its own library, it was found necessary to draw on the Library of Congress from time to time for the loan of about 800 volumes. The library of the Bureau now contains 16,050

volumes, about 11,600 pamphlets, and several thousand unbound periodicals. Although maintained primarily as a reference library for the Bureau's staff, its value is becoming more and more known to students not connected with the Smithsonian Institution, who make constant use of it. During the year the library was used also by officers of the executive departments and the Library of Congress.

MANUSCRIPTS.

During the first half of the fiscal year the manuscripts were under the custodianship of Mr. J. B. Clayton, and on his indefinite furlough at the close of 1909 they were placed in charge of Mr. J. N. B. Hewitt, as previously noted. Nineteen important manuscripts were acquired during the year, of which seven are devoted to Chippewa music and are accompanied with the original graphophone records, five relate to the history of the Indians, and seven pertain to Indian linguistics. This enumeration does not include the manuscript contributions to the Handbook of American Indians and the Handbook of American Indian Languages, nor the manuscripts submitted for publication by the members of the Bureau's regular staff.

REMOVAL OF OFFICES.

Quarters in the Smithsonian building having been assigned by the Secretary for the use of the Bureau, and funds having been provided by the sundry civil act for the removal of the Bureau's property, the work of transfer was commenced on December 10, 1909, by removing the library from the third floor of the Adams Building, 1333 F street NW., to the eastern gallery of the bird hall on the main floor of the Smithsonian building. The task was made difficult owing to the necessity of removing the old stacks and the books at the same time, but order was fairly established in about a fortnight and the library again put in service. Not only is more space for the growing library afforded by the new quarters, but increased light and facilities for research make the new library far superior to the old. The northern half of the gallery was made more attractive by painting and by carpeting with linoleum. It is yet lacking in necessary space, but this difficulty will be overcome when that part of the southeastern gallery still occupied by the National Museum is vacated.

The offices and photographic laboratory of the Bureau were removed between December 20 and 31, the former to the second, third, and fourth floors of the north tower of the Smithsonian building and one room (that occupied by the ethnologist-in-charge) on the third floor of the northeastern range; the laboratory to one of the galleries of the old National Museum building, while the stock of publications was given space on the fourth floor of the south tower. Although the quarters of the Bureau are now somewhat scattered, the facilities for work are far superior to those with which the Bureau in its rented offices was obliged to contend, and there is less danger of loss by fire. The cost of the removal, including the taking down and rebuilding of the library bookcases, necessary painting of walls and woodwork, linoleum floor covering, and electric wiring and fixtures, aggregated \$1,000, the sum appropriated for the purpose.

PROPERTY.

In addition to the books and manuscripts already referred to, the property of the Bureau consists of a moderate amount of inexpensive office furniture, chiefly desks, chairs, filing cases, and tables, as well as photographic negatives, apparatus, and supplies, typewriters, phonographs, stationery, and the undistributed stock of its publications. The removal of the Bureau and the assign-

ment of its members to less crowded quarters made it necessary to supply a few additional articles of furniture, especially for the library. The entire cost of the furniture acquired during the fiscal year was \$243.17.

ADMINISTRATION.

Pursuant to the plans of the secretary the clerical and laboring work of the Bureau was concentrated after the removal to the Smithsonian building by placing the routine correspondence and files, the accounts, the shipment of publications, the care of supplies and other property, and all cleaning and repairs, in immediate charge of the office of the Smithsonian Institution. This plan has served to simplify the administration of the affairs of the Bureau, has prevented duplication of effort, and has resulted in a saving of time and funds.

Respectfully submitted.

F. W. HODGE,
Ethnologist-in-Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX III.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit a report on the operations of the International Exchange Service during the fiscal year ended June 30, 1910.

There was given in the last report a list of the countries to which copies of the daily issue of the Congressional Record were forwarded direct by mail in accordance with the resolution of the Congress approved March 4, 1909, setting aside a certain number of copies of the Record for exchange, through the agency of the Smithsonian Institution, with the legislative chambers of such foreign governments as might agree to send to the United States, in return, current copies of their parliamentary record or like publication. The governments of Baden, Cape of Good Hope, New Zealand, Transvaal, and Western Australia have since entered into this exchange. A complete list of the countries to which the Record is now forwarded is given below.

Australia.	Greece.	Roumania.
Austria.	Guatemala.	Russia.
Baden.	Honduras.	Servia.
Belgium.	Hungary.	Spain.
Brazil.	Italy.	Switzerland.
Canada.	New South Wales.	Transvaal.
Cape of Good Hope.	New Zealand.	Uruguay.
Cuba.	Portugal.	Western Australia.
France.	Prussia.	

There are therefore at present 26 countries with which the immediate exchange is conducted. To some of these countries, however, two copies of the Congressional Record are sent—one to the upper and one to the lower house of parliament—the total number transmitted being 31. The number of copies of the daily issue of the Congressional Record provided for this purpose is 100, the same as the number of copies of official documents set apart for international exchange. The Institution is still in correspondence with other governments regarding this immediate exchange, and the list of those countries participating will no doubt be added to from time to time.

The number of packages handled during the past year was 221,625—a decrease from the number for the preceding year of 7,250. The total weight of these packages was 484,684 pounds—a gain of 8,515 pounds. Regarding the falling off in the number of packages handled, attention should be called to the fact that the increase in 1909 was the largest in the history of the service. Had the increase for that year been normal, the total number of packages for 1910 would have shown a gradual increase over the preceding year. The gain in weight may, to a great extent, be taken as an indication that consignments containing more than one publication were more numerous than during the preceding year. This circumstance is especially true in the case of consignments for the Library of Congress, 38 boxes having been received during the past year for that library and counted as single packages.

The appropriation by Congress for the support of the service was \$32,200 (the same amount as was granted for the fiscal years 1908 and 1909), and the sum collected on account of repayments was \$4,446.74, making the total available resources for carrying on the system of international exchanges \$36,646.74.

The exchange office continues to render assistance to the Library of Congress in obtaining foreign government documents needed to complete its sets.

It is gratifying to state that the exchange relations with Korea, which were interrupted during the late Russo-Japanese war, have been renewed, His Imperial Japanese Majesty's residency-general at Seoul having consented to act as the exchange intermediary between the two countries. The number of publications exchanged between Korea and the United States was never very large, and it is hoped that the establishment of an official medium through which consignments may be forwarded will result in a fuller interchange.

While the K. K. Statistische Central-Commission in Vienna has been acting as the exchange intermediary between Austria and the United States since 1898, it has been necessary for the Smithsonian Institution, under the arrangements entered into through the Imperial Academy of Sciences with the commission, to bear all the expenses for freight on consignments both to and from Vienna. The Government of Austria has now signified its willingness to assume its share of the cost of conducting the exchanges between the two countries, and in the future the Institution will therefore be relieved of this extra burden upon its resources. The exchange work on the part of Austria will continue to be carried on by the Statistical Commission. The thanks of the Institution are due to the president of the Imperial Academy of Sciences and to the president of the Statistical Commission for assistance in this matter.

I am very glad to be able to report that it now seems assured that the Institution will shortly be relieved of the expense of conducting the paid agency which it has maintained for many years in Leipzig to attend to the transmission and distribution of exchanges between Germany and the United States.

It is expected that in a few months there will be established in Berlin, under the auspices of the German Government, an institution to further the cultural relations between the two countries. This establishment will be known as the America Institute, and it will assume as one of its functions the transmission and distribution of German exchanges.

While the America Institute has not yet begun active operations, it is expected that it will be organized at an early day, and that it will be prepared to take over the work of the exchange agency by the end of the calendar year.

Dr. Hugo Munsterberg will be the first director of the America Institute.

It has been the practice of the Institution to forward by registered mail packages received from abroad for distribution in the United States. With a view to reducing the work in the Exchange Office and also to relieving the Post-Office Department of the extra expense entailed in handling this registered matter—numbering annually about 21,000 packages, aggregating a total weight of over 120,000 pounds—the custom of registering exchanges was discontinued on October 17, 1909, consignments now being forwarded by ordinary mail. It should be added in this connection, that the Institution is informed by the Post-Office Department that in the ordinary mail there is an average loss of only 1 package in 15,000.

Exchange consignments form part of the cargo of almost every fast steamship which leaves New York for a foreign port. It is therefore not surprising that occasionally a case is lost through the wrecking of a steamer. During the year a case containing exchanges for miscellaneous addresses in the Transvaal was destroyed while en route to Pretoria, the steamship *Norse Prince*, by which

it was transmitted, having been burned while off the coast of South Africa. The loss at sea during the latter part of 1908 of a case of exchanges for distribution in Egypt should also be noted here. This consignment was forwarded in care of the Egyptian Survey Department under date of October 22, 1908, but definite information concerning its loss has only recently been received. The senders of the packages contained in the consignments referred to were communicated with, and it is gratifying to state that, except in one or two instances, it was possible for them to supply copies of the lost publications. It may be of interest to add here that, so far as reported to the Institution, these are the only instances during the past five years in which the entire contents of exchange consignments have been lost.

INTERCHANGE OF PUBLICATIONS BETWEEN THE UNITED STATES AND OTHER COUNTRIES.

The statement which follows shows in detail the number of packages received for transmission through the International Exchange Service during the year ending June 30, 1910:

Country.	Packages.		Country.	Packages.	
	For.	From.		For.	From.
Abyssinia.....	1	.....	Denmark.....	2,082	377
Algeria.....	156	25	Dominica.....	37	.....
Angola.....	16	.....	Dutch Guiana.....	35	.....
Antigua.....	40	.....	Ecuador.....	248	.....
Arabia.....	27	.....	Egypt.....	464	3,806
Argentina.....	3,500	311	Eritrea.....	1	.....
Austria-Hungary.....	8,622	5,265	Falkland Islands.....	2	.....
Azores.....	41	.....	Fiji Islands.....	34	.....
Bahamas.....	36	.....	France.....	12,850	4,802
Barbados.....	110	.....	French Cochín China.....	65	.....
Beira.....	11	.....	French Guiana.....	13	.....
Belgium.....	4,377	3,572	German East Africa.....	32	.....
Bermudas.....	48	.....	Germany.....	24,057	8,032
Bismarck Archipelago.....	1	.....	Gibraltar.....	15	.....
Bolivia.....	178	52	Gold Coast.....	4	.....
Borneo.....	6	.....	Grenada.....	6	.....
Brazil.....	2,692	385	Great Britain and Ireland.....	22,197	6,896
British America.....	7,847	848	Greece.....	1,649	4
British Burma.....	20	549	Greenland.....	9	.....
British Central Africa.....	1	.....	Guadeloupe.....	7	.....
British East Africa.....	22	.....	Guatemala.....	494	.....
British Guiana.....	69	.....	Haiti.....	1,124	.....
British Honduras.....	68	.....	Hawaiian Islands.....	25	.....
British New Guinea.....	5	.....	Honduras.....	389	.....
Bulgaria.....	206	9	Hongkong.....	167	.....
Canary Islands.....	18	.....	Iceland.....	52	325
Cape Colony.....	1,830	29	India.....	2,793	633
Ceylon.....	240	.....	Italy.....	7,282	2,253
Chile.....	2,251	352	Jamaica.....	253	2
China.....	1,720	47	Japan.....	3,462	63
Colombia.....	1,298	.....	Java.....	274	85
Costa Rica.....	1,463	3	Kongo Free State.....	3	.....
Cuba.....	1,825	108	Korea.....	71	15
Curaçao.....	22	.....	Lagos.....	6	.....
Cyprus.....	6	.....	Liberia.....	162	1

Country.	Packages.		Country.	Packages.	
	For.	From.		For.	From.
Lourenço Marques.....	102	.....	St. Lucia.....	13	.....
Luxemburg.....	97	.....	St. Martin.....	11	.....
Madagascar.....	34	.....	St. Pierre and Miquelon.....	16	.....
Madeira.....	1	.....	St. Thomas.....	14	.....
Malta.....	99	.....	St. Vincent.....	6	.....
Martinique.....	13	.....	Salvador.....	109	5
Mauritius.....	78	.....	Samoa.....	18	.....
Mexico.....	1,783	255	Santo Domingo.....	19	.....
Montenegro.....	79	123	Sarawak.....	4	.....
Montserrat.....	3	.....	Senegal.....	5	.....
Morocco.....	20	.....	Servia.....	1,429	12
Natal.....	203	51	Siam.....	217	.....
Netherlands.....	3,276	1,488	Sierra Leone.....	21	.....
Nevis.....	13	.....	Society Islands.....	12	.....
Newfoundland.....	152	1	South Australia.....	2,021	39
New South Wales.....	2,896	734	Spain.....	2,853	209
New Zealand.....	2,507	110	Straits Settlements.....	230	.....
Nicaragua.....	221	.....	Sudan.....	43	1
Norfolk Island.....	15	.....	Sweden.....	3,255	106
Northern Nigeria.....	5	.....	Switzerland.....	4,029	1,304
Norway.....	2,190	514	Tahiti.....	13	.....
Orange River Colony.....	115	.....	Tasmania.....	1,285	2
Panama.....	128	.....	Transvaal.....	1,594	24
Paraguay.....	156	.....	Trinidad.....	126	.....
Peria.....	45	.....	Tripoli.....	2	.....
Peru.....	1,547	92	Tunis.....	44	6
Philippine Islands.....	203	.....	Turkey.....	1,580	1
Porto Rico.....	24	.....	Turks Islands.....	21	.....
Portugal.....	1,889	992	Uganda.....	1	.....
Queensland.....	1,494	76	United States.....	48,999	173,951
Reunion.....	30	.....	Uruguay.....	1,971	62
Rhodesia.....	66	.....	Venezuela.....	1,283	10
Roumania.....	747	33	Victoria.....	3,618	248
Russia.....	5,836	2,019	Western Australia.....	1,564	248
St. Croix.....	5	.....	Zanzibar.....	13	.....
St. Helena.....	4	.....		
St. Kitts.....	23	.....	Total.....	221,625	221,625

During the year there were sent abroad 2,033 boxes (an increase over 1909 of 70 boxes), of which 220 contained complete sets of United States Government documents for authorized depositories and 1,813 were filled with departmental and other publications for depositories of partial sets and for distribution to miscellaneous correspondents.

EXCHANGE OF GOVERNMENT DOCUMENTS.

The number of packages sent abroad through the International Exchange Service by United States Government establishments during the year was 138,152, an increase over the number forwarded during the preceding twelve months of 15,812; while 18,017 packages were received in exchange, a decrease of 2,199. This disparity between the number of packages received and those sent may be accounted for largely by the fact that many returns for the publications sent abroad are not made through the Exchange Service, but are for-

warded to their destinations direct by mail. This difference is further due to the practice of sending consignments to the Library of Congress intact, in many cases a whole box of publications being entered on the records of this office as one package.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENT DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 55 full sets of United States official publications and 33 partial sets.

While the Statutes at Large have for some years formed part of the sets of government documents provided for international exchange purposes, the Session Laws have only been added during the past year. This addition was made through the efforts of the Library of Congress, a request for the laws having been received from one of the depositories.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
 Argentina: Biblioteca de la Universidad Nacional de La Plata.
 Australia: Library of the Commonwealth Parliament, Melbourne.
 Austria: K. K. Statistische Central-Commission, Vienna.
 Baden: Universitäts-Bibliothek, Freiburg.
 Bavaria: Königlische Hof- und Staats-Bibliothek, Munich.
 Belgium: Bibliothèque Royale, Brussels.
 Brazil: Bibliotheca Nacional, Rio de Janeiro.
 Canada: Parliamentary Library, Ottawa.
 Cape Colony: Government Stationery Department, Cape Town.
 Chile: Biblioteca del Congreso Nacional, Santiago.
 China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
 Colombia: Biblioteca Nacional, Bogota.
 Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.
 Cuba: Department of State, Habana.
 Denmark: Kongelige Bibliotheket, Copenhagen.
 England: British Museum, London.
 England: London School of Economics and Political Science, London.
 France: Bibliothèque Nationale, Paris.
 France: Préfecture de la Seine, Paris.
 Germany: Deutsche Reichstags-Bibliothek, Berlin.
 Greece: Bibliothèque Nationale, Athens.
 Haiti: Secrétairerie d'État des Relations Extérieures, Port au Prince.
 Hungary: Hungarian House of Delegates, Budapest.
 India: Home Department, Government of India, Calcutta.
 Ireland: National Library of Ireland, Dublin.
 Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
 Japan: Department of Foreign Affairs, Tokyo.
 Manitoba: Provincial Library, Winnipeg.
 Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
 Netherlands: Library of the States General, The Hague.
 New South Wales: Board for International Exchanges, Sydney.

New Zealand: General Assembly Library, Wellington.
 Norway: Storthingets Bibliothek, Christiania.
 Ontario: Legislative Library, Toronto.
 Peru: Biblioteca Nacional, Lima.
 Portugal: Bibliotheca Nacional, Lisbon.
 Prussia: Königliche Bibliothek, Berlin.
 Quebec: Legislative Library, Quebec.
 Queensland: Parliamentary Library, Brisbane.
 Russia: Imperial Public Library, St. Petersburg.
 Saxony: Königliche Oeffentliche Bibliothek, Dresden.
 Servia: Ministère des Affaires Etrangères, Belgrade.
 South Australia: Parliamentary Library, Adelaide.
 Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
 Sweden: Kungliga Biblioteket, Stockholm.
 Switzerland: Bibliothèque Fédérale, Berne.
 Tasmania: Parliamentary Library, Hobart.
 Transvaal: Government Library, Pretoria.
 Turkey: Department of Public Instruction, Constantinople.
 Uruguay: Oficina de Depósito, Reparto y Canje Internacional de Publicaciones, Montevideo.
 Venezuela: Biblioteca Nacional, Carácas.
 Victoria: Public Library, Melbourne.
 Western Australia: Public Library of Western Australia, Perth.
 Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Alberta: Legislative Library, Edmonton.
 Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
 Bolivia: Ministerio de Colonización y Agricultura, La Paz.
 British Columbia: Legislative Library, Victoria.
 Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 Bulgaria: Minister of Foreign Affairs, Sofia.
 Ceylon: United States Consul, Colombo.
 Ecuador: Biblioteca Nacional, Quito.
 Egypt: Bibliothèque Khédiviale, Cairo.
 Guatemala: Secretary of the Government, Guatemala.
 Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
 Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
 Honduras: Secretary of the Government, Tegucigalpa.
 Jamaica: Colonial Secretary, Kingston.
 Liberia: Department of State, Monrovia.
 Lourenço Marquez: Government Library, Lourenço Marquez.
 Malta: Lieutenant-Governor, Valetta.
 Montenegro: Ministère Princier des Affaires Étrangères, Cetinje.
 Natal: Colonial Governor, Pietermaritzburg.
 Newfoundland: Colonial Secretary, St. Johns.
 New Brunswick: Legislative Library, St. John.
 Nicaragua: Superintendente de Archivos Nacionales, Managua.
 Northwest Territories: Government Library, Regina.
 Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
 Orange River Colony: Government Library, Bloemfontein.
 Panama: Secretaría de Relaciones Exteriores, Panama.
 Prince Edward Island: Legislative Library, Charlottetown.

Paraguay: Oficina General de Informaciones y Canjes y Comisaria General de Inmigracion, Asuncion.

Roumania: Academia Romana, Bucarest.

Salvador: Ministerio de Relaciones Exteriores, San Salvador.

Straits Settlements: Colonial Secretary, Singapore.

Siam: Department of Foreign Affairs, Bangkok.

Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

CORRESPONDENTS.

The names of new correspondents in every part of the world are constantly being added to the exchange list, so that they now reach a total of 63,605, an increase of 975 over those of the preceding year. These correspondents are subdivided as follows:

Foreign institutions.....	3, 925
Foreign individuals.....	8, 300
Domestic institutions.....	16, 700
Domestic individuals.....	34, 780

A table showing the number of correspondents in each country at the close of 1907 will be found in the report for that year.

RULES GOVERNING THE TRANSMISSION OF EXCHANGES.

The circular containing the rules governing the transmission of exchanges has been revised during the year, and under date of June 30, 1910, a new edition was published. The circular is here reproduced for the information of those who may wish to make use of the facilities of the service in the forwarding of exchanges:

In effecting the distribution of its first publications abroad the Smithsonian Institution established relations with certain foreign scientific societies and libraries by means of which it was enabled to materially assist institutions and individuals of this country in the transmission of their publications abroad and also foreign societies and individuals in distributing their publications in the United States.

In recent years the Smithsonian Institution has been charged with the duty of conducting the official exchange bureau of the United States Government, through which the publications authorized by Congress are exchanged for those of other governments; and by a formal treaty it acts as intermediary between the learned bodies and literary and scientific societies of the contracting states for the reception and transmission of their publications.

Attention is called to the fact that this is an international and not a domestic exchange service, and that it is used to facilitate exchanges between the United States and other countries only. As exchanges from domestic sources for addresses in Hawaii, the Philippine Islands, Porto Rico, and other territory subject to the jurisdiction of the United States do not come within the designation "international," they are not accepted for transmission.

Packages prepared in accordance with the rules enumerated below will be received by the Smithsonian Institution from persons or institutions of learning in the United States and forwarded to their destinations through its own agents or through the various exchange bureaus in other countries. The Smithsonian agents and these bureaus will likewise receive from correspondents in their countries such publications for addresses in the United States and territory subject to its jurisdiction as may be delivered to them under rules similar to those prescribed herein, and will forward them to Washington, after which the Institution will undertake their distribution.

On the receipt of a consignment from a domestic source it is assigned a "record number," this number being placed on each package contained in the consignment. A record is then made of the entire list of packages under the sender's name, and the separate packages are entered under the name of the person or office addressed. An account is thus established with every correspondent of the Institution, which shows readily what packages each one has sent or received through the Exchange Service. The books are then packed in boxes with contributions from other senders for the same country, and are forwarded by fast freight to the bureau or agency abroad which has undertaken to distribute exchanges in that country. To Great Britain and Germany, where paid agencies of the Institution are maintained, shipments are made weekly; to all other countries transmissions are made at intervals not exceeding one month.

Consignments from abroad for correspondents in the United States and its possessions are distributed by mail under frank, a record having first been made of the name of the sender and of the address of each package.

The Institution assumes no responsibility in the transmission of packages, but at all times uses its best endeavors to forward promptly to destination exchanges intrusted to its care.

The rules governing the Smithsonian International Exchange Service are as follows:

1. Consignments from correspondents in the United States containing packages for transmission abroad should be addressed "Smithsonian Institution, International Exchanges, Washington, D. C."

2. In forwarding a consignment the sender should address a letter to the Institution, stating by what route it is being shipped, and the number of boxes or parcels of which it is composed.

3. Packages should be legibly addressed, using, when practicable, the language of the country to which they are to be forwarded. In order to avoid any possible dispute as to ownership, names of individuals should be omitted from packages intended for societies and other establishments.

4. Packages should be securely wrapped in stout paper and, when necessary, tied with strong twine.

5. No package to a single address should exceed about one-half of one cubic foot.

6. Letters are not permitted in exchange packages.

7. If donors desire acknowledgments, packages may contain receipt forms to be signed and returned by the establishment or individual addressed; and, should publications be desired in exchange, a request to that effect may be printed on the receipt form or on the package.

8. Exchanges must be delivered to the Smithsonian Institution or its agents with all charges paid.

- 9. The Institution and its agents will not knowingly receive for any address purchased books; apparatus or instruments of any description, whether purchased or presented; nor specimens of any nature except when permission from the Institution has been obtained, and then only under the following conditions:

- (a) Specimens in fluid will not be accepted for transmission.

- (b) Botanical specimens will be transmitted at the rate of 8 cents per pound.

- (c) All other specimens will be transmitted at the rate of 5 cents per pound.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

Following is a list of bureaus or agencies through which the distribution of exchanges is effected. Those in the larger and many in the smaller countries

forward to the Smithsonian Institution in return contributions for distribution in the United States:

Algeria, via France.

Angola, via Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Calle Peru No. 655, Buenos Aires.

Austria: K. K. Statistische Central-Commission, Vienna.

Azores, via Portugal.

Barbados: Imperial Department of Agriculture, Bridgetown.

Belgium: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

Bermuda. (Sent by mail.)

Bolivia: Oficina Nacional de Estadística, La Paz.

Brazil: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.*

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions et Bibliothèque Scientifiques de S. A. R. le Prince de Bulgarie, Sofia.

Canada. (Sent by mail.)

Canary Islands, via Spain.

Cape Colony: Government Stationery Department, Cape Town.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: Zi-ka-wei Observatory, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.

Cuba. (Sent by mail.)

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Director-General, Survey Department, Giza (Mudiria).

France: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

Friendly Islands. (Sent by mail.)

Germany: Karl W. Hiersemann, Königsstrasse 29, Leipzig.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, via Denmark.

Guadeloupe, via France.

Guatemala: Instituto Nacional de Varones, Guatemala.

Guinea, via Portugal.

Haiti: Secrétaire d'Etat des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Municipal Office of Statistics, City Hall, Budapest.

Iceland, via Denmark.

India: India Store Department, India Office, London.

* This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

- Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.
- Jamaica: Institute of Jamaica, Kingston.
- Japan: Department of Foreign Affairs, Tokyo.
- Java, via Netherlands.
- Korea: His Imperial Japanese Majesty's Residency-General, Seoul.
- Liberia: Department of State, Monrovia.
- Lourenço Marquez: Government Library, Lourenço Marquez.
- Luxemburg, via Germany.
- Madagascar, via France.
- Madeira, via Portugal.
- Mexico. (Sent by mail.)
- Montenegro: Ministère Princier des Affaires Étrangères, Cetinje.
- Mozambique, via Portugal.
- Natal: Agent-General for Natal, London.
- Netherlands: Bureau Scientifique Central Néerlandais. Bibliothèque de l'Université, Leyden.
- Newfoundland. (Sent by mail.)
- New Guinea, via Netherlands.
- New Hebrides. (Sent by mail.)
- New South Wales: Board for International Exchanges, Public Library, Sydney.
- New Zealand: Dominion Museum, Wellington.
- Nicaragua: Ministerio de Relaciones Exteriores, Managua.
- Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
- Panama: Secretaría de Relaciones Exteriores, Panama.
- Paraguay: Ministerio de Relaciones Exteriores, Asuncion.
- Persia: Board of Foreign Missions of the Presbyterian Church, New York City.
- Peru: Oficina de Reparto. Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
- Portugal: Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
- Queensland: Board of Exchanges of International Publications, Parliament House, Brisbane.
- Roumania, via Germany.
- Russia: Commission Russe des Echanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
- Saint Christopher. (Sent by mail.)
- Salvador: Ministerio de Relaciones Exteriores, San Salvador.
- Santo Domingo. (Sent by mail.)
- Servia: Section Administrative du Ministère des Affaires Etrangères, Belgrade.
- Siam: Department of Foreign Affairs, Bangkok.
- South Australia: Public Library of South Australia, Adelaide.
- Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- Sumatra, via Netherlands.
- Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.
- Switzerland: Service des Echanges Internationaux, Bibliothèque Fédérale Centrale, Bern.
- Syria: Board of Foreign Missions of the Presbyterian Church, New York.
- Tasmania: Royal Society of Tasmania, Hobart.
- Transvaal: Government Library, Pretoria.
- Trinidad: Victoria Institute, Port of Spain.
- Tunis, via France.
- Turkey: American Board of Commissioners for Foreign Missions, Boston.

Uruguay: Oficina de Depósito, Reparto y Canje Internacional, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

Zanzibar. (Sent by mail.)

In conclusion, it is my sad duty to record here the death, on January 27, 1910, of Ferdinand V. Berry, Chief Clerk of the International Exchange Service. Mr. Berry was appointed as clerk January 9, 1884, and became chief clerk of the exchanges on July 1, 1907. During the twenty-six years that Mr. Berry served the Institution his work was faithfully and efficiently performed, and his loss is deeply regretted.

Respectfully submitted.

O. W. SHOEMAKER,

Chief Clerk, International Exchange Service.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX IV.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to present herewith a report of the operations of the National Zoological Park for the fiscal year ended June 30, 1910.

The appropriation for that year was \$95,000, and the estimated amount for current maintenance was \$83,706.92, leaving but \$11,293.08 from which to make necessary repairs and extensions of buildings, improvements of roads and grounds, and additions to the collection.

The largest sum expended for any one object was that of \$5,291, for the transportation of animals from Africa, a detailed account of which is appended hereto. For the accommodation of these animals alterations and additions were made to the buildings already in use. In the extension to the lion house a number of small and comparatively slight cages were removed and six new and larger ones, strong enough to hold lions and other large cats, were built in. The antelope house was enlarged by an extension 50 by 50 feet, thus furnishing ten additional stalls and a much needed new entrance. The building, although very simple in construction, is now admirably adapted for accommodating visitors, having three entrances with convenient approaches. The new stalls or cages are provided with commodious yards, which were nearly completed at the close of the fiscal year.

The first work of the year was the construction of a suitable pool for sea lions and seals, which was established in the wooded valley occupied by the beaver. This pool is 47 by 96 feet, with a depth of 6 feet 3 inches. It has a shelter house of stone, ample banks, and a level border, the whole inclosed with an iron fence.

Two watchman's houses were placed at the park entrance and a flag pole was erected on the hill south of the lion house.

This was all the new work that it was possible to execute from the limited amount available.

Minor improvements and repairs were made as follows: Concrete steps and walk to the bird house; connecting the culvert in the beaver valley with Rock Creek sewer; painting flying cage; surfacing gravel and cinder walks; making a serviceable road to the coal vault of the central heating plant.

Much of this work it has been possible to carry on economically by the use of stone from a quarry in the park and of sand and gravel from the creek.

The following is a tabular statement of the cost of this work:

Alterations to lion house.....	\$1, 100. 00
Addition to antelope house, with approach.....	2, 500. 00
Sea-lion pond, including stonework, concrete construction, fencing, grading, planting, and walk.....	2, 025. 00
Two watch houses (\$125 each).....	250. 00
Flag pole	100. 00
Steps and walk to bird house.....	110. 00
Culvert and connection.....	600. 00
Repainting flying cage.....	425. 00
Surfacing walks	600. 00
Road to coal vault.....	125. 00

AFRICAN ANIMALS.

While the Smithsonian Expedition was in British East Africa Mr. W. N. McMillan, of Nairobi, presented to the park a collection of East African animals which he had gathered at his place, Juja farm, about 25 miles from Nairobi. The collection included 5 lions, 2 cheetahs, a leopard, a Grant's gazelle, a wart-hog, and several smaller mammals and birds. It was thought advisable to send the assistant superintendent of the park to Nairobi to attend to the shipping and come through with the animals, on account of the importance and value of this collection, and the fact, stated by the Smithsonian party, that other desirable specimens, already in captivity, could be obtained in the region about Nairobi, and also because of the special precautions which the Agricultural Department required to be taken in order to prevent the introduction of contagious diseases, either through the animals themselves or by means of food or other supplies obtained for them. He left Washington toward the end of July, 1900, and returned with the animals December 17. Shipment from Mombasa was made October 28 by a steamer of the Compagnie des Messageries Maritimes. At Port Said the animals were transferred to a lighter and kept there, without landing, for thirteen days, awaiting the arrival of a steamer going directly to Philadelphia. The voyage from Port Said, by a German freight steamer, occupied twenty-six days, but the weather was unusually favorable. With the exception of a few animals, very recently captured or very young, there was no loss between Nairobi and Philadelphia. The ruminants and wart-hog were held in quarantine at Philadelphia for about six weeks to allow thorough inspection and inoculation tests to be made to determine whether they carried any communicable disease. It is gratifying that all proved to be free from disease, since the region from which they came can furnish many important animals which are as yet but little represented in zoological collections. Through the kindness of the Philadelphia Zoological Society the animals were kept at their gardens during the time of quarantine. The two cheetahs had died before shipment was made and the male Grant's gazelle had been killed by accident. With these exceptions all of the animals presented by Mr. McMillan reached Washington safely and are still at the park. A pair of eland, a pair of Coke's hartebeest, a waterbuck, a Grant's zebra, and a bateleur eagle, which were purchased, reached Philadelphia in apparently good condition, but the male eland died of impaction of the intestine while in quarantine. A young male eland was presented by Lord Delamere, but, being in poor condition when received, lived only a few days. A pair of Thomson's gazelle and an impala, all very young, and a pair of white-bearded gnu, caught just before shipping, also died very soon.

Mr. G. H. Goldfinch, assistant game ranger of British East Africa, presented a hyrax and two specimens of *Lophiomys*, a rare and little-known rodent.

The 21 animals which reached the United States included 15 species, of which 13 were species or subspecies not at any time before represented in the collection of the park. The lions are of the subspecies known as "Killimanjaro lion" (*Felis leo sabakiensis*).

In arranging for transportation it was necessary to go to London and Hamburg, and, taking advantage of the opportunity, brief visits were made to 14 zoological gardens in Europe, and the Giza Garden, near Cairo, was visited on the return.

The expenditures in connection with these animals were:

Freight, hauling, and expenses of transshipping.....	\$2,555
Purchase of animals.....	728
Cages for shipping.....	450

Food for animals.....	\$520
Transportation and subsistence of A. B. Baker.....	730
Help with animals, including services of attendants, gratuities to ship's officers, etc.....	190
Telegraph and cable messages.....	43
Miscellaneous.....	75
Total.....	5, 291

Thirty-four species or subspecies new to the collection were exhibited during the year, including:

Killimanjaro lion.	Defassa waterbuck.	Cape hyrax.
Clouded leopard.	Grant's gazelle.	Short-tailed eagle.
Indian tapir.	Muntjac.	Warlike crested eagle.
East African eland.	Grant's zebra.	
Coke's hartebeest.	Northern warthog.	

The most important losses were:

Indian tapir.	Dromedary.	2 jabirus.
East African eland.	2 llamas.	Whooping crane.
2 Rocky Mountain sheep.	2 jaguars.	North African ostrich.
3 mule deer.	2 Tasmanian wolves.	
Reindeer.	2 leopards.	

One hundred and sixty-two dead animals were sent to the National Museum.

Autopsies were made by pathologists of the Bureau of Animal Industry on 99 animals, showing causes of death as follows:

Pneumonia	22	Hydrophilosis	2
Tuberculosis	7	Proteusbacillosis	1
Pulmonary congestion	2	Porocephalus infestation	1
Aspergillosis	5	Septicemia	1
Gastro-enteritis	8	Intestinal parasites	1
Enteritis	12	Enterotoxism	1
Gastritis	7	Psoroptic mange	1
Hemorrhagic enteritis	2	Eversion of rectum	1
Nephritis	3	Traumatism	1
Fatty degeneration of liver	1	Malnutrition from faulty teeth	1
Peritonitis	2	Suffocation	1
Metritis	1	Old age	2
Intestinal coccidiosis	5	No cause found	3
Cercomoniiasis	5		

VISITORS.

The number of visitors to the park during the year was 721,555, a daily average of 1,977. This number is an increase over the previous year of 156,816, and an increase in the daily average of 430. The largest number in any month was 156,432, in March, 1910, a daily average for the month of 5,046.

During the year there visited the park 155 schools, Sunday schools, classes, etc., with 3,883 pupils, a monthly average of 324 pupils. While most of them were from the city and immediate vicinity, 34 of the schools were from neighboring States, and classes came from Falmouth and Haverhill, Massachusetts; Stafford Springs, Connecticut; Rochester, Dover, Exeter, and Newport, New Hampshire; Bellows Falls, Vermont; and Sanford, Maine.

*Statement of the collection.***Accessions during the year:**

Presented	87
Received in exchange	8
Purchased	139
Deposited	8
Born and hatched in National Zoological Park	64
Captured in National Zoological Park	1
Total	307

PRESENTED..

Rhesus monkey, Miss Justine Ingersoll, Boston, Mass.....	2
Common macaque:	
William, F. Wenger, Washington, D. C.....	1
G. R. Tompkins, Warrenton, Va.....	1
Bonnet macaque, G. R. Tompkins, Warrenton, Va.....	1
Baboon, W. N. McMillan, Nairobi, British East Africa.....	1
White-throated capuchin, Roland Davis, Washington, D. C.....	1
Lion, W. N. McMillan, Nairobi, British East Africa.....	5
Leopard, W. N. McMillan, Nairobi, British East Africa.....	1
Bay lynx, Adams Express Co., Washington, D. C.....	1
Florida lynx, Howard Elliott, Washington, D. C.....	1
Coyote, R. P. Neuman, Englewood, Kans.....	2
Gray fox, J. F. Unverzagt, Washington, D. C.....	1
American otter, Frederic B. Hyde, Washington, D. C.....	2
Kinkajou, Surg. W. H. Bell, U. S. Navy, Cristobal, Canal Zone.....	1
Common skunk, F. C. Duehring, Washington, D. C.....	1
Cinnamon bear, E. S. Bruce, U. S. Forest Service.....	1
Virginia deer, Thos. Blagden, Washington, D. C.....	1
Common goat, John R. McLean, Washington, D. C.....	4
Grant's gazelle, W. N. McMillan, Nairobi, British East Africa.....	1
Northern warthog, W. N. McMillan, Nairobi, British East Africa.....	1
Lophomys, G. H. Goldfinch, Asst. Game Ranger, Nairobi, British East Africa.....	1
English rabbit:	
Mrs. Birdsall, Washington, D. C.....	1
Mrs. Street, Washington, D. C.....	2
Common opossum:	
Charles L. Medley, Victoria, Mo.....	1
E. Droop, Washington, D. C.....	2
The President, Washington, D. C.....	2
D. L. Coon, Washington, D. C.....	1
Albino opossum, donor unknown.....	1
Sparrow hawk, Mrs. C. H. McAndrie, Washington, D. C.....	1
Sharp-shinned hawk, E. L. Burritt, Washington, D. C.....	1
Red-shouldered hawk, T. Hanlon, Washington, D. C.....	1
Bald eagle, Col. R. L. Montague, Washington, D. C.....	1
Warlike crested eagle, W. N. McMillan, Nairobi, British East Africa.....	1
Hawk, W. N. McMillan, Nairobi, British East Africa.....	1
Egyptian vulture, W. N. McMillan, Nairobi, British East Africa.....	1
Pileated vulture, W. N. McMillan, Nairobi, British East Africa.....	1
Great horned owl:	
John Ricketts, Flinton, Pa.....	1
Donor unknown.....	1

Barn owl:

R. H. Chappell, Washington, D. C.----- 1

Dr. C. N. Lenman, Washington, D. C.----- 1

Screech owl:

Raymond Campbell, Washington, D. C.----- 1

Mrs. Arthur Lee, Washington, D. C.----- 1

Red and yellow and blue macaw, D. S. Sheahan, Washington, D. C.----- 1

Red-shouldered Amazon, Mrs. Bicknell, Washington, D. C.----- 1

Yellow-fronted Amazon, B. Munoz, Honduras.----- 1

Parrakeet:

Mrs. Leigh Hunt, Bethesda, Md.----- 2

M. B. Tubman, Washington, D. C.----- 1

Common canary:

M. Doumer, Washington, D. C.----- 1

Mrs. H. C. Steuart, Washington, D. C.----- 1

Cutler Vickery, Washington, D. C.----- 1

Java sparrow, Miss M. Britton, Washington, D. C.----- 4

Jungle fowl, Dr. C. B. Davenport, Cold Spring Harbor, N. Y.----- 2

Wood ibis, A. M. Nicholson, Orlando, Fla.----- 2

Whistling swan, Mrs. Fitzgerald, Washington, D. C.----- 1

Brant, Dr. H. L. Gosling, Washington, D. C.----- 1

Alligator:

Mark Sloane, Washington, D. C.----- 1

Miss C. Harndon, Washington, D. C.----- 1

Dr. W. S. Harban, Washington, D. C.----- 1

DeF. Lerner, Washington, D. C.----- 1

Edgar Shreve, Washington, D. C.----- 1

Mrs. Mary Bartlett, West Milford, W. Va.----- 2

Gila monster, Gustav Friebe, Washington, D. C.----- 1

Rattlesnake, G. H. White, Washington, D. C.----- 1

Black snake:

W. V. Cox, Washington, D. C.----- 1

Thos. C. Johnson, Deanwood, D. C.----- 1

House snake, Thos. C. Johnson, Deanwood, D. C.----- 1

Garter snake, H. F. Carl, Washington, D. C.----- 1

SUMMARY.

Animals on hand July 1, 1909----- 1,416

Accessions during the year----- 307

Total----- 1,723

Deduct loss (by exchange, death, and returning of animals)----- 299

On hand June 30, 1910----- 1,424

	Species.	Individuals.
Mammals.....	153	625
Birds.....	184	682
Reptiles.....	35	107
Total.....	372	1,424

Respectfully submitted.

FRANK BAKER,
Superintendent.Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX V.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1910:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington, in an inclosure of about 16,000 square feet, are contained five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, California, upon a leased plot of ground 100 feet square in horizontal projection, are located a one-story cement observing structure, designed especially for solar constant measurements, and also a little frame cottage, 21 feet by 25 feet, built and furnished last September for observer's quarters. It is highly satisfactory to note from the decrease in probable error of the observations secured in 1909 on Mount Wilson, compared with those of previous years, that the new cement observatory there, located as it is far from the dust, smoke, and disturbances of the other parts of the mountain, is excellently adapted for securing the most exact results.

WORK OF THE YEAR.

The present year's results are of uncommon interest, for they appear to fix within narrow limits the value of the solar constant of radiation. When in 1902 the first attempts were made here to measure it, that first-rank constant of nature, the intensity of the solar radiation at the earth's mean distance from the sun, was unknown within the wide range between 1.75 and 4 calories per square centimeter per minute. This range of values is given, with a preference for Langley's value (3 calories), by Hann in his standard work on meteorology, published in 1905.

It is improbable that this observatory would have continued since 1902 in solar-constant work had it not been that the results of 1903 gave strong indications of considerable variability of the sun in short intervals and that later work also strongly supported this presumption. The late director, Secretary Langley, shared, with many others of the most competent judges on the subject, the impression that to determine the solar constant of radiation with any considerable degree of accuracy or certainty was, if not impossible, yet a thing which would probably be long deferred and would involve spectro-bolometric measurements at the highest possible altitudes at which men may exist. He did not at all believe that our results of 1903 approximated to the true value of the solar constant, but only that they might be so far independent of ordinary atmospheric changes as to be used in determining the probability of solar variability. Hence, in 1905, he instructed the present writer to bear in mind, in going to Mount Wilson for the first time, that it was not the solar constant but

the possibility of solar variability which was the result to be determined by the expedition. This inquiry has, indeed, been the primary one in all the subsequent work, but not to the exclusion of attempts to fix the value of the solar constant itself.

There were at that time two principal and seemingly formidable difficulties hindering the determination of the solar constant of radiation. First, there was no instrument capable of absorbing fully and adapted for measuring completely the energy received at the earth's surface, excepting, perhaps, the little-known and rarely used instrument invented by W. A. Michelson, of Russia, about 1894. Second, there was grave doubt if a true estimate of the loss of radiation in traversing the air could be made. Langley has somewhere described the first obstacle as "formidable," the second as "perhaps insurmountable."

As stated in previous reports, much attention was given from 1903 onward to devising a standard pyrheliometer, and thus establishing the absolute scale of radiation measurements. A considerable degree of success seemed to be attained in 1906, but the results obtained in that year were found, by comparison with instruments of the United States Weather Bureau, to differ so much from the generally adopted scale of Ångström that further work, involving finally the construction of two additional water-flow pyrheliometers, was done. The last of these instruments, and by far the most perfect of them all, was completed and tried at Mount Wilson in October, 1909. A fairly close agreement seemed to hold between it and its immediate predecessor, but when the electrical constants of both instruments were determined with extreme care in February, at Washington, by Mr. Aldrich, the gap widened. A source of error, till then little regarded, was reconsidered, and painstaking comparisons of pyrheliometers were carried through at Washington by Messrs. Aldrich, Abbot, and Fowle. These were finished in June, 1910, and the two standard pyrheliometers were found to agree together well within the probable error of the highly accurate experiments. Not only so, but each instrument was found to take up and measure between 99 and 100 per cent of such various quantities of electrically introduced heat as were used as tests. Finally these definite measurements indicated that while the results published at page 46 in volume 2 of the *Annals*, made with standard pyrheliometer No. 1, are 4 or 5 per cent above the true scale, yet when all the experiments made with that instrument, at Washington as well as Mount Wilson, are collected their mean result is almost in exact agreement with the results obtained in 1910 with standard pyrheliometers Nos. 2 and 3.

It may now be accepted that the absolute scale of radiation is established within three parts in 1,000, and that we may express all our measurements of solar radiation made since 1902 with this degree of accuracy in absolute calories per square centimeter per minute.

Three secondary pyrheliometers, the cost of whose construction after my designs has been defrayed from the Hodgkins Fund, have been standardized and sent to Russia, France, and Italy. Two others have been sold by the Institution to the United States Agricultural Department. Thus steps are being taken to diffuse the standard scale of pyrheliometry. The new scale is about 5.2 per cent above that of new Ångström pyrheliometers.

The second obstacle mentioned above seems now less serious than the first. It was found in 1905 and 1906 that practically identical values of the solar constant resulted from good series of spectro-bolometric observations of the same day taken at Washington (sea level) and Mount Wilson (8,000 feet elevation). But in August, 1909, Mr. Abbot ascended Mount Whitney (14,500 feet) with a complete spectro-bolometric outfit, and, notwithstanding many days of

unpromising weather, succeeded on September 3, under the most perfect sky and in exceptionally dry air, in making a complete and satisfactory series of solar constant measurements. A prism of quartz and two mirrors of magnalium were the only optical parts to affect the rays, so that it was possible to observe from wave length $0.29\ \mu$ to wave length $8.0\ \mu$. This extended region includes not only all the visible but the ultra-violet and infra-red spectra, with sufficient completeness to include in the discussion apparently within 1 per cent of all the rays which the sun sends the earth and to make the allowance for rays not observed practically sure. During the same day Mr. Ingersoll observed with the usual complete spectro-bolometric outfit on Mount Wilson, and his results were in accord with what would be expected from his preceding and following day's work there and agreed within 1 per cent with those obtained simultaneously on Mount Whitney.

In view of the agreement of results on the solar constant of radiation obtained at sea level, 1 mile, and $2\frac{1}{2}$ miles elevation, it now seems highly probable that we can really by Langley's method of homogeneous rays allow for losses in the air and get the same values that we would observe directly if we could take our instruments above the air altogether.

The reduction of spectro-bolographic work to the absolute scale of pyrheliometry enables us to give as the average value of the solar constant of radiation for the epoch 1905 to 1909, 1.924 calories per square centimeter per minute. It is probable that observations at sun-spot minimum will tend to raise this value by rather more than 1 per cent, so that we may suppose the mean value of the solar constant for a complete sun-spot cycle will be about 1.95 calories.

Experiments made in 1909 at Mount Wilson with various optical systems agree within their probable error with one another, and with the results obtained on Mount Whitney in fixing the distribution of energy in the spectrum of the sun outside the atmosphere. In the Mount Whitney work the curve of energy distribution was followed to a wave-length estimated (not very accurately) as 0.29μ and it there practically reached zero intensity, although the quartz and magnalium apparatus would have been capable of transmitting the rays, had they existed, of much shorter wave-lengths. In the spectrum of the "perfect radiator," corresponding to the apparent temperature of the sun, the intensity of the ultra-violet rays would be of some importance for a considerably farther stretch of wave-lengths beyond this. It therefore appears that either the earth's atmosphere, even above Mount Whitney, or else the sun's envelope, effectually hinders the solar rays. If it is the former, then it may be that the above-mentioned value of the solar constant should still be raised a few per cent. But the known powerful selective absorption of vapors in the sun's envelope seems quite reasonably competent alone to produce the observed weakness of the solar spectrum in the ultra-violet. This view is confirmed by experiments of Miethe and Lehmann, who found no extension of the solar spectrum with increasing elevation, although they shifted their observing station from Berlin (50 meters) to Monte Rosa (3,500 meters), thus greatly diminishing the layer of air traversed. Their shortest wave-length was 0.2911μ , closely agreeing with ours.

From our experiments of 1909 the apparent average solar temperature is 6430° , 5840° , or 6200° of the absolute, according as we follow Wien's displacement law, Stefan's law, or Planck's law as the method of computation. But the temperature of the sun, apart from the uncertainty of terms when dealing with such high values, is probably a quantity which has very various values, from the center to the limb of the sun's disk, depending on the depth within the sun at which the radiation originates.

At Washington Messrs. Fowle and Aldrich have continued experiments on the transmission by moist columns of air for long-wave radiation, though with

many interruptions due to the difficulty of the research. The work has been carried to wave-length beyond 15μ in the infra-red, and for columns of air 800 feet long. It is not yet possible to summarize the results.

Messrs. Fowle and Aldrich and Miss Graves have made rapid progress with the reduction of solar-constant work of 1909.

Experiments have been begun for the purpose of devising economical means of utilizing solar energy for domestic purposes.

PERSONNEL.

Dr. L. R. Ingersoll served as temporary bolometric assistant on Mount Wilson to September 6, 1909.

Mr. L. B. Aldrich was given a temporary appointment as bolometric assistant at Washington beginning September 1, 1909. He passed a competitive examination and was reappointed provisionally on January 10, 1910. His appointment was made permanent, to begin July 1, 1910.

SUMMARY.

The work of the year is notable for the determination of the absolute scale of pyrhellometry and for the success of spectrobolometric observations of the solar constant of radiation on Mount Whitney. These agree with simultaneous observations of the same kind on Mount Wilson. Reducing these and other results to the absolute scale of pyrhellometry, we may fix the average value of the solar constant of radiation at 1.925 calories per square centimeter per minute for the epoch 1905-1909. Making allowance for the higher values which must prevail at sun-spot minimum, the solar constant may be estimated at 1.95 calories as an average value for a sun-spot cycle. No reason has been found for departing from the view heretofore held that short-interval variations of 5 per cent or more from this value occur. The energy distribution in the solar spectrum outside the atmosphere has been determined with the bolometer on Mount Whitney between wave lengths 0.29μ in the ultra violet and 3.0μ in the infra red. This region appears to contain full 99 per cent of all the solar energy outside the atmosphere. The apparent temperature of the sun as computed by three different methods comes out 6430° , 5840° , and 6200° of the absolute scale. Researches on the transmission of moist columns of air for long-wave rays, such as the earth emits, have been continued to wave lengths beyond 15μ , and for columns of air 800 feet in length. Secondary pyrheliometers, standardized to the absolute scale, have been sent to Russia, France, and Italy, and also furnished to the United States Weather Bureau and Department of Agriculture.

Respectfully submitted.

C. G. ABBOT, *Director.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX VI.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report on the operations of the library of the Smithsonian Institution for the fiscal year ending June 30, 1910:

The accessions recorded for the Smithsonian deposit, Library of Congress, numbered 2,653 volumes, 2,879 parts of volumes, 1,396 pamphlets, and 623 charts, making a total of 7,551 publications. The accession numbers run from 495,195 to 500,000. These publications were forwarded to the Library of Congress immediately upon their receipt and entry. In their transmission 270 boxes were required, containing approximately the equivalent of 10,300 volumes. The actual number of pieces sent, including parts of periodicals, pamphlets, and volumes, numbered 36,526. This statement does not, however, include about 2,948 parts of serial publications secured in exchange to complete sets and transmitted separately.

The Institution has continued the policy of sending public documents presented to it to the Library of Congress without stamping or entering. The number of publications given above does not include these, nor does it include other publications for the Library of Congress received through the International Exchange Service.

The libraries of the Smithsonian office, of the Astrophysical Observatory, and the National Zoological Park have received 473 volumes and pamphlets and 253 parts of volumes and charts, making a total of 626 publications, and a grand total, including the publications for the Smithsonian deposit, of 8,177. The actual decrease in the number of publications entered for the Smithsonian library is not as great as would at first appear, owing to the fact that in the present report a statement has been made of the number of completed volumes accessioned, rather than, as was formerly the custom, of the number of parts constituting a volume. Special attention has been given to the checking up and completing of the Smithsonian deposit sets of publications of scientific societies and learned institutions of the world, together with the series of scientific periodicals contained in the library.

The parts of serial publications entered on the card catalogue numbered 26,772, and 1,605 slips for completed volumes were made; 277 cards for new periodicals and annuals, together with 418 donor cards and 1,114 catalogue cards for separate publications were made and filed.

Inaugural dissertations and academic publications were received and accessioned from universities at the following places:

Basel.	Halle an der Saale.	St. Petersburg.
Berkeley.	Leipzig.	Utrecht.
Berlin.	Liege.	Vienna.
Breslau.	Lund.	Würzburg.
Graz.	Paris.	

The establishing of new exchanges and the securing of missing parts to complete sets of publications in the Smithsonian library required the writing of

3,251 letters, resulting in the addition of about 277 periodicals and in the receipt of about 2,948 missing parts.

The library has again cooperated with the International Exchanges in sending to foreign countries lists of government documents and serial publications of that class needed to complete the sets in the Library of Congress. In addition to the countries already enumerated in previous reports, lists have been sent to Natal, New Zealand, Spain, and Venezuela.

The publications in the reading room being in the main of a class not to be found elsewhere, a yearly increase is to be noted in the number of persons consulting them. The readers include scientific workers not only from Washington, but from other American and foreign cities. The staff has withdrawn for office use 52 bound volumes of periodicals and 3,336 parts of scientific periodicals and popular magazines. In addition, the various bureaus of the Government continue to avail themselves of the opportunity to use these publications as well as those in the sectional libraries of the institution.

The mail receipts numbered 43,222 packages, and 7,117 packages were received through the International Exchange Service. The publications contained therein were stamped and distributed for entry from the mail desk. About 5,111 acknowledgments were made on the regular forms in addition to the letters which were written in acknowledgment of publications received in response to the requests of the institution for exchange.

The employees' library.—The books added to this library by purchase numbered 30, and by binding 300 volumes of periodicals were made available for circulation. The total number of books borrowed was 2,092. The sending of a selected number of books from this library to the National Zoological Park has been continued, but the sending of books to the Bureau of American Ethnology was discontinued when the Bureau moved into the Smithsonian building in January, 1910.

Bibliography of aeronautics.—The manuscript for the Bibliography of Aeronautical Literature to July 1, 1909, was completed during the summer of that year, and the work, forming volume 55 of the Smithsonian Miscellaneous Collections, was published during the month of April, 1910. Numerous accessions have been made to the collection of aeronautical literature in the office library. The volumes have been bound and are now available for reference.

At the request of the American committee on cooperation with the International Congress of Archivists and Librarians, the assistant librarian prepared an answer to the question "*Dans quel sens y a-t-il lieu de réorganiser et d'étendre le service des échanges internationaux?*" The reply was sent in the latter part of January for presentation to the congress convening in Brussels August 27 to 31.

American Historical Association.—The arranging of new exchanges of the annual reports of the American Historical Association from the allotment agreed upon for that purpose has resulted in a number of publications of historical societies throughout the world being added to the Smithsonian deposit at the Library of Congress.

UNITED STATES NATIONAL MUSEUM.

The library of the Museum has suffered from congestion and is handicapped in its work by lack of space. While it has continued to grow during the last ten years, no additional room has been available owing to the overcrowded condition of the Museum building. As the new building is now ready for the collections it will be possible in the near future for the library to have all the room necessary for expansion and proper classification. Many gifts of importance have been received, those deserving special mention being the publications presented

by Dr. Theodore N. Gill, Dr. Charles W. Richmond, Dr. Charles A. White, Dr. E. A. Schwartz, Dr. O. P. Hay, and Dr. Marcus Benjamin. The publications are scientific and of value in completing sets and filling in of the series of authors' separates.

In the death of Dr. Charles A. White the Museum library has lost one of its valued benefactors. Doctor White was at all times ready to forward the interests of the Museum library and gave material assistance in the work of completing its series of authors' separates and its sets of periodical publications. His gifts have been numerous and are of special value along the lines of the work upon which he was engaged.

Lists of the publications in the sectional libraries of the Museum have been made, and an experienced cataloguer has been checking them up with the publications on the shelves in the sections. The work of checking is uncompleted at the close of the fiscal year, but will be continued.

In the Museum library there are now 38,300 volumes, 61,858 unbound papers, and 110 manuscripts. The accessions during the year consisted of 2,066 books, 5,541 pamphlets, and 307 parts of volumes; 1,001 books, 1,055 complete volumes of periodicals, and 6,294 pamphlets were catalogued.

Attention has been given to the preparation of volumes for binding, with the result that 435 books were sent to the government bindery.

The number of books, periodicals, and pamphlets borrowed from the general library amounted to 23,272, including 4,148 from the collections which were assigned to the sectional libraries.

The sectional libraries established in the Museum have remained unchanged, the complete list now standing as follows:

Administration.	Geology.	Mollusks.
Administrative assistant.	History.	Oriental archæology.
Anthropology.	Insects.	Paleobotany.
Biology.	Invertebrate paleontol-	Parasites.
Birds.	ogy.	Physical anthropology.
Botany.	Mammals.	Prehistoric archæology.
Comparative anatomy.	Marine invertebrates.	Reptiles.
Editor.	Materia medica.	Superintendent.
Ethnology.	Mesozoic fossils.	Taxidermy.
Fishes.	Mineralogy.	Technology.

SUMMARY OF ACCESSIONS.

The following table summarizes all the accessions during the year except for the Bureau of American Ethnology, which is separately administered:

Smithsonian deposit in the Library of Congress, including parts to complete sets	10,499
Office, Astrophysical Observatory, National Zoological Park, and International Exchanges	626
United States National Museum Library	7,904
Total	19,029

Respectfully submitted.

PAUL BROCKETT, *Assistant Librarian.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX VII.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1910.

The International Catalogue of Scientific Literature is an international co-operative enterprise having at present 32 regional bureaus scattered throughout the world, supported by the countries taking part in the work. The duties of these regional bureaus are to collect, index, and classify all contributions to pure science published within the several countries they represent. The material thus prepared is forwarded to the Central Bureau in London, there to be assembled and published.

The catalogue consists of 17 annual volumes, one for each of the following sciences: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology.

The Central Bureau is maintained entirely by the funds received from the subscribers to the catalogue. The regional bureaus are in every case supported by the countries taking part in the enterprise, in the great majority of cases by direct governmental grants.

Since the beginning of the undertaking in 1901 the annual volumes have increased in size to such an extent that the cost of publication at one time exceeded the sum received from subscriptions, and it was necessary to curtail somewhat not only the methods of classifying the various subjects, but also the citation methods used in the subject catalogues. This is now being done without detracting in any way from the value of the catalogue as a work of reference, although the labor of preparation is in most cases much greater.

The allotment for the present fiscal year was \$8,000. Five persons are regularly engaged in the Bureau, and occasionally, when funds permit, the assistance of a specialist in some one of the sciences is temporarily employed.

There were 25,082 cards sent from this Bureau during the year as follows:

Literature of 1901.....	72
Literature of 1902.....	173
Literature of 1903.....	248
Literature of 1904.....	465
Literature of 1905.....	1,163
Literature of 1906.....	1,502
Literature of 1907.....	3,160
Literature of 1908.....	6,305
Literature of 1909.....	11,994
Total.....	25,082

This number does not represent the actual number of citations sent, for on account of a new ruling of the Central Bureau some of the biological cards contained a number of citations each. However, the actual number of cita-

tions has been reduced to approximately 28,000 for the year, which is about 6,000 less than was sent in for the previous year. This decrease is not entirely due to the new methods of classifying, for as the work is each year being brought more nearly up to date fewer old papers are indexed, consequently fewer citations are required. It is estimated that when the work is entirely up to date only about 25,000 citations will be needed to completely index the yearly scientific literature of the United States.

The following-named volumes of the catalogue were received and delivered to the subscribers in this country:

Seventh annual issue: Meteorology, General Biology, Botany, Anatomy, Anthropology, and Bacteriology.

Eighth annual issue: Mathematics, Mechanics, Astronomy, Mineralogy, and Zoology.

For a number of years it has been the aim to eventually prepare this catalogue not only through the cooperation of the various countries, but through direct cooperation of authors and publishers of the papers indexed. This method was actually tried during the present year in the preparation of the volume on zoology, and though it required writing about 517 letters, the result was so satisfactory that it is proposed to gradually extend the method to other sciences.

As has been pointed out before, the London Central Bureau is maintained solely by means of the funds obtained from subscriptions to the catalogue, and the necessary cost of editing and printing is so great that \$85 per year has to be charged for the complete set of 17 volumes. This large figure places the work beyond the reach of many who would undoubtedly purchase individual volumes, if not the complete sets. The cost of doubling the edition of the catalogue would be comparatively small, the outlay representing only the cost of press work and paper, and it is felt that if the edition could be doubled and the price reduced one-half, the work could be placed at once within the reach of many small libraries and scientific workers who need such works of reference.

At present the available funds prevent any such course being adopted, but a comparatively small endowment would not only render this move possible, but would enable the present restricted scope of the catalogue to be extended to include at first the applied sciences and then gradually the other records of human progress. A yearly income of \$5,000 or \$6,000 from a permanent endowment would enable the central bureau to take the necessary steps to first increase the circulation and then broaden the scope of the catalogue, and it is earnestly hoped that in the near future such an endowment may be obtained.

There have been no losses of property during the year, excepting those caused by ordinary wear and deterioration.

In the sundry civil bill approved June 25, 1910, \$7,500 was appropriated to carry on the work for the fiscal year ending June 30, 1911. This sum is an increase of \$1,500 over the appropriation of the present year.

Respectfully submitted.

LEONARD C. GUNNELL,
Chief Assistant.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.
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APPENDIX VIII.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1910:

There was distributed a total of 801 volumes and separates in the series of Smithsonian Contributions to Knowledge, 17,560 in the series of Smithsonian Miscellaneous Collections, 28,879 in the series of Smithsonian Annual Reports, and 2,179 in the series of Special Publications. In addition, there were 959 publications not included in the Smithsonian series distributed by the Institution, and 5,274 publications of the Bureau of American Ethnology sent out during the six months from January 1 to June 30, 1910. This makes a grand total of 55,652, an increase of 11,489 over the previous year.

I. SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

No memoirs of the series of Smithsonian Contributions to Knowledge were issued during the year, although progress was made in preparing for press the Langley Memoir on Mechanical Flight which was begun by the late Secretary Langley in 1904 and continued by Mr. Charles M. Manly, assistant in charge of experiments.

II. SMITHSONIAN MISCELLANEOUS COLLECTIONS.

In the series of Smithsonian Miscellaneous Collections there were published during the year (1) fifteen papers in the Quarterly Issue, which was discontinued December 31, 1909, completing volume 52 of the regular series; (2) one paper in volume 51; (3) seven papers in volume 54, completing that volume; (4) volume 55, Bibliography of Aeronautics; (5) and seven papers in volume 56. The Quarterly Issue papers were as follows:

1872. Smithsonian Miscellaneous Collections. Volume 52, part 4 (Quarterly Issue, vol. 5, part 4) containing Publications, 1873 to 1887. Published January 20, 1910. Octavo. Pages viii, 403-514, with plates 38 to 66. (The Quarterly Issue ends with this volume.)
1873. Prehistoric Ruins of the Gila Valley. By J. Walter Fewkes. Published August 4, 1909. Octavo. Pages 403 to 436, with Plates 38 to 42.
1874. Description of a New Frog from the Philippine Islands. By Leonhard Stejneger, Curator, Division of Reptiles and Batrachians, U. S. National Museum. Published August 4, 1909. Octavo. Pages 437-439.
1875. A New Genus of Fossil Cetaceans from Santa Cruz Territory, Patagonia; and Description of a Mandible and Vertebrae of *Proscqualodon*. By Frederick W. True, Head Curator of Biology, U. S. National Museum. Published August 7, 1909. Octavo. Pages 441-456, with Plates 43 to 45.
1876. Notes on Certain Features of the Life of the Alaskan Freshwater Sculpin. By Barton A. Bean and Alfred C. Weed, of the Division of Fishes, U. S. National Museum. Published August 19, 1909. Octavo. Pages 457-460.

1877. *The Geologic Work of Mangroves in Southern Florida.* By T. Wayland Vaughan, Custodian of Madreporarian Corals, U. S. National Museum; Supervising Geologist in Charge of Coastal Plain Investigations, U. S. Geological Survey. Published September 15, 1909. Octavo. Pages 461-464, with Plates 46 to 52.
1878. *Chrystallographic Notes on Calcite.* By J. E. Pogue, Assistant Curator, Division of Mineralogy, U. S. National Museum. Published September 24, 1909. Octavo. Pages 465-468, with Plates 53 and 54.
1879. *A New Rodent of the Genus Georychus.* By Edmund Heller, Field Naturalist, Smithsonian African Expedition. Published September 24, 1909. Octavo. Pages 469-470, with Plate 55.
1880. *Two New Rodents from British East Africa.* By Edmund Heller, Field Naturalist, Smithsonian African Expedition. Published November 13, 1909. Pages 471-472, with Plate 56.
1881. *A Heretofore Undescribed Stony Meteorite from Thomson, McDuffie County, Georgia.* By George P. Merrill, Head Curator, Department of Geology, U. S. National Museum. Published December 2, 1909. Octavo. Pages 473-476. Plates 57 and 58.
1882. *On a Remarkable Cube of Pyrite Carrying Crystallized Gold and Galena of Unusual Habit.* By Joseph E. Pogue, Assistant Curator, Division of Mineralogy, U. S. National Museum. Published December 22, 1909. Octavo. Pages 477-484, with Plate 59.
1883. *A New Carnivore of British East Africa.* By Gerrit S. Miller, jr., Curator, Division of Mammals, U. S. National Museum. Published December 18, 1909. Octavo. Pages 485-487, with Plates 60 to 62.
1884. *Description of Fossil Plants from the Mesozoic and Cenozoic of North America. I.* By F. H. Knowlton. Published January 11, 1910. Octavo. Pages 489-496, with Plates 63 and 64.
1885. *Two New Genera of Murine Rodents.* By Gerrit S. Miller, jr., Curator, Division of Mammals, U. S. National Museum. Published January 12, 1910. Octavo. Pages 497-498.
1886. *A Shelter for Observers on Mount Whitney.* By C. G. Abbot, Director of the Smithsonian Astrophysical Observatory. Published January 12, 1910. Octavo. Pages 499-506, with Plates 65 and 66.
1887. *List of Publications, continued from list in Quarterly Issue, volume 5, part 3.* Published January 21, 1910. Octavo. Pages 507-509.

In the regular series of the Smithsonian Miscellaneous Collection the following were published, during the year:

1869. *The Mechanics of the Earth's Atmosphere (a collection of translations). Third Collection.* By Cleveland Abbe. Hodgkins Fund. Published 1909. Octavo. Pages iv, 617. Volume 51, Number 4.
1870. *Landmarks of Botanical History, Part I, Prior to 1562 A. D.* By Edward L. Greene. Published 1909. Octavo. Pages 329. Part of volume 54.
1920. *Bibliography of Aeronautics.* By Paul Brackett. Hodgkins Fund. Published 1910. Octavo. Pages xiv, 940. Volume 55.
1922. *Development of the Brain of the American Alligator; The Paraphysis and Hypophysis.* By Albert M. Reese. Published March 1, 1910. Octavo. Pages 20, with 5 plates. Volume 54, Number 2.
1923. *Constants of Nature. Part 5, A Recalculation of Atomic Weights. Third edition.* By Frank Wigglesworth Clarke. Published May 6, 1910. Octavo. Pages iv, 548. Volume 54, Number 3.
1924. *Five New Rodents from British East Africa.* By Edmund Heller. Published February 23, 1910. Octavo. Pages 2+4, with 2 plates. Volume 54, Number 4.

1925. A New Rodent of the Genus *Saccostomus* from British East Africa. By Gerrit S. Miller, jr. Published February 28, 1910. Octavo. Pages 2+2, with 1 plate. Volume 54, Number 5.
1926. A New Sable Antelope from British East Africa. By Edmund Heller. Published March 3, 1910. Octavo. Pages 2+2. Volume 54, Number 6.
1927. Description of a New Species of *Hippopotamus*. By Gerrit S. Miller, jr. Published March 28, 1910. Octavo. Pages 2+3, with 4 plates. Volume 54, Number 7.
1929. The Scales of the African Characinid Fishes. By T. D. A. Cockerell. Published May 7, 1910. Octavo. Pages 2+10, with 2 plates. Volume 56, Number 1.
1930. Mammals Collected by John J. White in British East Africa. By N. Hollister. Published March 31, 1910. Octavo. Pages 2+12, with 2 plates. Volume 56, Number 2.
1931. The Scales of the Mormyrid Fishes, with Remarks on *Albula* and *Elopa*. By T. D. A. Cockerell. Published May 7, 1910. Pages 2+4. Volume 56, Number 3.
1933. Upper Yukon Native Customs and Folk-Lore. By Ferdinand Schmitter. Published May 26, 1910. Octavo. Pages 2+30. Volume 56, Number 4.
1935. A Preliminary Study of Chemical Denudation. By Frank Wigglesworth Clarke. Published June 29, 1910. Octavo. Pages 2+19. Volume 56, Number 5.
1936. The Age of the Earth. By George F. Becker. Published June 29, 1910. Octavo. Pages 2+28. Volume 56, Number 6.
1937. Description of a New Subspecies of African Monkey of the Genus *Cercopithecus*. By D. G. Elliot. Published June 11, 1910. Octavo. Pages 2+1. Volume 56, Number 7.

Of the regular series of Smithsonian Miscellaneous Collections in press at the close of the year, there were:

1934. Cambrian Geology and Paleontology. Number 6: *Olenellus* and other Genera of the *Mesonacidae*. By Charles D. Walcott. Volume 53, Number 6.
1939. Cambrian Geology and Paleontology. Number 7: Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada. By Charles D. Walcott. Volume 53, Number 7.
1940. Cambrian Geology and Paleontology. II. Abrupt Appearance of the Cambrian Fauna on the North American Continent. By Charles D. Walcott. Volume 57, Number 1.
1941. Notes on the Horn-feeding Lepidopterous Larva from Africa. By August Busck. Volume 56, Number 8.

III. SMITHSONIAN ANNUAL REPORTS.

The Annual Report for 1908, though partly in type at the beginning of the fiscal year, was not published until late in the fall.

1917. Annual Report of the Board of Regents of the Smithsonian Institution, showing Operations, Expenditures, and Conditions of the Institution for the year ending June 30, 1908. Octavo. Pages x, 801, with 101 plates. Containing publications 1855, 1856, and 1888 to 1914.

The following papers, forming the General Appendix of the Annual Report of the Board of Regents for 1908, were issued in pamphlet form:

1888. The Present Status of Military Aeronautics. By Maj. George O. Squier, U. S. Army. Pages 117-144, with 23 plates.
1889. Aviation in France in 1908. By Pierre-Roger Jourdain. Pages 145-159.

1890. Wireless Telephony. By R. A. Fessenden. Pages 161-195, with 20 plates.
1891. Phototelegraphy. By Henri Armagnat. Pages 197-207.
1892. The Gramophone and the Mechanical Recording and Reproduction of Musical Sounds. By Lovell W. Reddie. Pages 209 to 231, with 2 plates.
1893. On the Light Thrown by Recent Investigation on Electricity on the Relation between Matter and Ether. By J. J. Thomson. Pages 233-244.
1894. Development of General and Physical Chemistry During the Last Forty Years. By W. Nernst. Pages 245-253.
1895. Development of Technological Chemistry During the Last Forty Years. By O. H. Witt. Pages 255-262.
1896. Twenty Years' Progress in Explosives. By Oscar Guttman. Pages 263-300, with 9 plates.
1897. Recent Research in the Structure of the Universe. By J. C. Kapteyn. Pages 301-319.
1898. Solar Vortices and Magnetism in Sun Spots. By C. G. Abbot. Pages 321-338, with 5 plates.
1899. Climatic Variations: Their Extent and Causes. By J. W. Gregory. Pages 339-354.
1900. Uranium and Geology. By Prof. John Joly. Pages 355-384, with 1 plate.
1901. An Outline Review of the Geology of Peru. By George I. Adams. Pages 385-430, with 5 plates.
1902. Our Present Knowledge of the Earth. By E. Wiechert. Pages 431-449.
1903. The Antarctic Question—Voyages to the South Pole since 1898. By J. Machat. Pages 451-480, with 1 plate.
1904. Some Geographical Aspects of the Nile. By Capt. H. G. Lyons. Pages 481-503, with 5 plates.
1905. Heredity, and the Origin of Species. By Daniel Trembly MacDougal. Pages 505-523, with 1 plate.
1906. Cactaceæ of Northeastern and Central Mexico, together with a Synopsis of the Principal Mexican Genera. By William Edwin Safford. Pages 525-563, with 15 plates. (A separate edition with index was also published.)
1907. Angler Fishes: Their Kinds and Ways. By Theodore Gill. Pages 565-615.
1908. The Birds of India. By Douglas Dewar. Pages 617-639.
1909. The Evolution of the Elephant. By Richard S. Lull. Pages 641-675, with 2 plates.
1910. Excavations at Boghaz-Keui in the Summer of 1907. By Hugo Winckler and O. Puchstein. Pages 677-696, with 10 plates.
1911. Malaria in Greece. By Ronald Ross. Pages 697-710.
1912. Carl von Linné as a Geologist. By A. G. Nathorst. Pages 711-743.
1913. Life and Work of Lord Kelvin. The Kelvin Lecture. By Sylvanus P. Thompson. Pages 745-768, with 1 plate.
1914. The Work of Henri Becquerel. By André Broca. Pages 769-785, with 1 plate.

The report of the executive committee and Proceedings of the Board of Regents of the Institution, as well as the report of the Secretary, for the fiscal year ending June 30, 1909, both forming part of the annual report of the Board of Regents to Congress, was printed in pamphlet form and published at the December meeting of the Board of Regents, as follows:

1915. Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1909. Pages iii, 95.
1916. Report of the Executive Committee and Proceedings of the Board of Regents for the year ending June 30, 1909. Pages 19.

The Smithsonian Report for 1909 was partly in type at the close of the fiscal year. In the General Appendix are the following papers:

- The Future of Mathematics, by Henri Poincaré.
 What Constitutes Superiority in an Airship, by Paul Renard.
 Researches in Radiotelegraphy, by J. A. Fleming.
 Recent Progress in Physics, by Sir J. J. Thomson.
 Production of Low Temperatures, and Refrigeration, by L. Marchia.
 The Nitrogen Question from the Military Standpoint, by Charles E. Munroe.
 Simon Newcomb, by Ormond Stone.
 Solar-radiation Researches by Jules César Janssen, by H. de la Baume Pluvinel.
 The Return of Halley's Comet, by W. W. Campbell.
 The Upper Air, by E. Gold and W. A. Harwood.
 The Formation, Growth, and Habit of Crystals, by Paul Gaubert.
 The Distribution of Elements in Igneous Rocks, by Henry S. Washington.
 The Mechanism of Volcanic Action, by H. J. Johnston-Lávis.
 Conservation of Natural Resources, by James Douglas.
 The Antarctic Land of Victoria, by Maurice Zimmermann.
 Some Results of the British Antarctic Expedition, 1907-9, by E. H. Shackleton.
 The Oceanography of the Sea of Greenland, by D. Damas.
 From the Niger, by Lake Chad, to the Nile, by Lieut. Boyd Alexander.
 Mesopotamia: Past, Present, and Future, by Sir William Willcocks.
 Albert Gaudry and the Evolution of the Animal Kingdom, by Ph. Glangeaud.
 Charles Darwin, by August Weismann.
 Present Problems in Plant Ecology: Problems of Local Distribution in Arid Regions, by Volney M. Spalding.
 The Instinct of Self-concealment and the Choice of Colors in the Crustacea, by Romuald Minkiewicz.
 The Origin and Development of Parasitical Habits in the Cuculidæ, by C. L. Barrett.
 Some Remarks on the Protective Resemblance of South African Birds, by Alwin Haagner.
 An Inquiry into the History of the Current English Names of North American Land Birds, by Spencer Trotter.
 Condition of Wild Life in Alaska, by Madison Grant.
 Recent Discoveries Bearing on the Antiquity of Man in Europe, by George Grant MacCurdy.
 European Population of the United States, by W. Z. Ripley.
 The Republic of Panama and its People, by Eleanor Yorke Bell.
 Ceramic Decoration: Its Evolution and Applications, by Louis Franchet.
 Some Notes on Roman Architecture, by F. T. Baggallay.
 The Relation of Science to Human Life, by Adam Sedgwick.
 Intellectual Work among the Blind, by Pierre Villey.
 The Relation of Mosquitoes, Flies, Ticks, Fleas, and other Arthropods to Pathology, by G. Marotel.
 Natural Resistance to Infectious Disease and its Reinforcement, by Simon Flexner.

IV. SPECIAL PUBLICATIONS.

Only one special publication, in the form of a small pamphlet, was issued during the year:

The Smithsonian Institution, at Washington, for the Increase and Diffusion of Knowledge among Men.

There were two special publications nearly ready at the close of the year :
1932. Classified List of Smithsonian Publications available for distribution May, 1910.
1933. Opinions Rendered by the International Commission on Zoological Nomenclature, Opinions 1 to 25.

V. PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report, forming a separate volume of the report to Congress by the Board of Regents of the Smithsonian Institution; (b) the Proceedings of the United States National Museum; (c) the Bulletin of the United States National Museum; and (d) the Contributions from the United States National Herbarium. The editorship of these publications is in charge of Dr. Marcus Benjamin.

The publications issued during the year are enumerated in the report on the National Museum. These included volume 37 of the Proceedings, containing Museum papers numbered 1695 to 1724, and volume 38, papers numbered 1725-1749.

Eight Bulletins were issued, as follows:

- No. 65. Dendroid Graptolites of the Niagaran Dolomites at Hamilton, Ontario. By Ray S. Bassler.
- No. 66. A Monographic Revision of the Twisted Winged Insects comprising the Order Strepsiptera Kirby. By W. Dwight Pierce.
- No. 67. Directions for Collection and Preserving Insects. By Nathan Banks.
- No. 68. A Monograph of West American Pyramidellid Mollusks. By William Healy Dall and Paul Bartsch.
- No. 69. The Tænioid Cestodes of North American Birds. By Brayton Howard Ransom.
- No. 70. The National Gallery of Art, Department of Fine Arts of the National Museum. By Richard Rathbun.
- No. 71. A Monograph of the Foraminifera of the North Pacific Ocean. Part I, *Astrorhizidae* and *Lituolidae*. By Joseph Augustine Cushman.
- No. 72. Catalogue of Nearctic Spiders. By Nathan Banks.

In the series of Contributions from the National Herbarium there appeared:
 Volume 12, Part 10. Miscellaneous papers, by J. N. Rose, N. L. Britton, John M. Coulter, and G. N. Collins.
 Volume 13, Part 2. Three New Species of *Echeveria*, by J. N. Rose and J. A. Purpus.
 Volume 13, Part 3. The Grasses of Alaska, by F. Lamson-Scribner and Elmer D. Merrill.
 Volume 13, Part 4. New or Noteworthy Plants from Colombia and Central America—2, by Henry Pittier.
 Volume 13, Part 5. Relationships of the Ivory Palms, by O. F. Cook.
 Volume 14, Part 1. The Lichens of Minnesota, by Bruce Fink.
 Preliminary pages and index of volume 12, Systematic Investigations and Bibliography.

VI. PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the Bureau are discussed in detail in another appendix of the Secretary's report. The editorial work is in charge of Mr. J. G. Gurley. The following five bulletins were published by the Bureau during the year:

Bulletin 38. Unwritten Literature of Hawaii. The sacred songs of the Hula, compiled and translated, with notes and an account of the Hula, by Nathaniel B. Emerson, A. M., M. D. 1909. Octavo. Pages 288, with 24 plates, 3 figures, and 14 musical pieces.

- Bulletin 39. Tlingit Myths and Texts, by John R. Swanton. 1909. Octavo. Pages VIII, 451.
- Bulletin 41. Antiquities of the Mesa Verde National Park: Spruce-Tree House, by J. Walter Fewkes. 1909. Octavo. Pages VIII, 57, with 21 plates and 37 figures.
- Bulletin 48. The Choctaw of Bayou LaCombe, St. Tammany Parish, Louisiana, by David I. Bushnell, jr. 1909. Octavo. Pages 37, with 22 plates and 1 figure.
- Bulletin 49. List of the publications of the Bureau of American Ethnology, with index to authors and titles. 1910. Octavo. Pages 32.

VII. PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

There were no new publications issued by the Astrophysical Observatory during the year.

VIII. AMERICAN HISTORICAL ASSOCIATION.

The manuscript of Volumes I and II of the Annual Report of the American Historical Association for 1907 was sent to the Public Printer on September 10, 1908, and the volumes were published in July, 1909.

Volume I contained the following papers:

- Report of the Proceedings of the Twenty-third Annual Meeting of the American Historical Association, by Charles H. Haskins, corresponding secretary.
- Report of the Proceedings of the Pacific Coast Branch, by Clyde A. Duniway.
- Report of Conference on the Relation of Geography and History, by Frederick J. Turner.

Report of Conference on the Work of State and Local Historical Societies, by Evarts B. Greene.

Reports on special conferences on Mediæval European History, on Modern European History, on Oriental History and Politics, on American Constitutional History, and on United States History since 1835, by the respective chairmen of the conferences.

Proposals for an Indian State, 1778-1878, by Annie H. Abel.

The Pacific Railroads and the Disappearance of the Frontier in America, by Frederic L. Paxson.

The Sentiment of the People of California with Respect to the Civil War, by John J. Earle.

The Relation of the U. S. to Latin America, by Bernard Moses;

Legazpi and Philippine Colonization, by James A. Robertson;

Report of the Public Archives Commission;

Francisco de Miranda and the Revolutionizing of Spanish America, by William S. Robertson.

Volume 2 contained the report of the Historical Manuscripts Commission, comprising Diplomatic Archives of the Republic of Texas, I, edited by George P. Garrison.

The manuscript of Volume I of the report for 1908 was sent to the printer on June 17, 1909, and the manuscript of Volume II was received from the secretary of the association and sent to the Public Printer in April, 1910, but neither volume had been completed at the close of the fiscal year.

IX. DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the annual report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1909, was received on April 18, 1910, and communicated to Congress in accordance with the act of incorporation of that society.

X. SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution as well as those offered for printing in the Smithsonian Miscellaneous Collections. The committee also considered forms of routine blanks and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-five meetings were held and 106 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



REPORT OF THE SECRETARY
OF THE
SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1911



(Publication 2065)

WASHINGTON
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1911

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT,
FOR THE YEAR ENDING JUNE 30, 1911.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit a report showing the operations of the Institution and its branches during the year ending June 30, 1911, including the work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper, with brief paragraphs relating to the several branches, while the appendix presents detailed reports by those in direct charge of the work. Independently of the present report, the operations of the National Museum and the Bureau of American Ethnology are fully treated of in separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

On July 4, 1910, Chief Justice Fuller died and was succeeded on December 19 by Chief Justice Edward Douglass White as *ex officio* member of the board.

At a meeting of the Board of Regents on December 8, 1910, the Hon. James S. Sherman, Vice President of the United States, was elected Chancellor.

The personnel of the board has been further changed by the resignation of Hon. John B. Henderson and the appointment of John B. Henderson, jr., as a Regent.

GENERAL CONSIDERATIONS.

The Smithsonian Institution has had a powerful influence for more than 60 years in the development of science in the United States. Its achievements in many lines of research and exploration have been of great good in the promotion of the welfare of the human race. The Institution and its branches continue to be engaged in a wide range of activities, covering practically the entire field of natural and physical science, as well as anthropological and archeological researches.

In my last report I referred to the establishment of a trust fund, through the generosity of Mrs. E. H. Harriman, which yields an annual income of \$12,000, to be devoted to the definite purpose of carrying on scientific studies, particularly of American mammals and other animals, the donor specifying Dr. C. Hart Merriam as the investigator to carry on the work during his lifetime. I believe it desirable to establish a number of such research associateships, whereby especially capable men in other branches of science may be afforded opportunities for research work without the care and burden of administrative duties, and with full assurance that as long as their work is properly conducted it will be continued and that provision will be made for them when incapacitated for active service. The field for scientific investigation is extensive, and there are numbers of worthy projects that can not now be undertaken because of lack of means—projects that could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

Friends of the Institution have from time to time generously provided funds for carrying on important explorations and researches, as in the case of the Smithsonian African expedition, and more recently by largely supporting the Smithsonian biological survey of the Panama Canal Zone.

It seems proper that I should here call special attention to the motive which led the late George W. Poore, of Lowell, Massachusetts, who died December 17, 1910, to make the Smithsonian Institution his residual legatee. By the terms of the will the estate, esti-

mated to be about \$40,000, is bequeathed under the condition that the income from this sum should be added to the principal until a total of \$250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created. The fund will be known as the Lucy T. and George W. Poore fund. The closing words of this item of the will read as follows:

I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institute to be, and yet it has been neglected and overlooked by American citizens.

ADMINISTRATION.

On account of the large increase in the administrative work of the Institution and its branches, brought about by the natural growth of their activities and the addition of new interests, it appeared advisable to appoint an additional Assistant Secretary, to have immediate charge of the Library and International Exchanges. With the approval of the Regents, I appointed to that position Dr. Frederick William True, who entered the service of the Institution in 1878 and for several years had been head curator of biology in the United States National Museum. Dr. True entered upon the active duties of his office on June 1, 1911.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithsonian, 1846.....	\$515, 169. 00
Residuary legacy of Smithsonian, 1867.....	28, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000. 00
Accumulated interest on Hamilton fund, 1895.....	1, 000. 00
	<hr/>
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposit from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins.....	7, 918. 69
	<hr/>
Total amount of fund in the United States Treasury.....	944, 918. 69
Registered and guaranteed bonds of the West Shore R. R. Co. (par value), part of legacy of Thomas G. Hodgkins.....	42, 000. 00
	<hr/>
Total permanent fund	986, 918. 69

In addition to the above, there are four pieces of real estate bequeathed to the Institution by the late R. S. Avery, some of which yield a nominal rental and all are free from taxation.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$83,435.30, was derived as follows: Interest on the permanent foundation, \$58,375.12; contributions from various sources for specific purposes, \$14,518.43; and from other miscellaneous sources, \$10,541.75; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$35,364.88 on July 1, 1910, the total resources for the fiscal year amounted to \$118,800.18. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$86,374.52, leaving a balance of \$32,425.66 on deposit June 30, 1911, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1911:

International exchanges.....	\$32,000
American Ethnology.....	42,000
Astrophysical Observatory.....	13,000
National Museum:	
Furniture and fixtures.....	125,000
Heating and lighting.....	50,000
Preservation of collections.....	300,000
Books.....	2,000
Postage.....	500
Building repairs.....	15,000
Building.....	77,000
National Zoological Park.....	115,000
International Catalogue of Scientific Literature.....	7,500
Elevators, Smithsonian Building.....	10,000
Total.....	789,000

EXPLORATIONS AND RESEARCHES.

Various scientific explorations and researches have been carried on during the past year by the Institution as far as its limited income and the generosity of its friends would permit. There have also been important biological, ethnological, and astrophysical researches by the National Museum, the Bureau of American Ethnology, and the Astrophysical Observatory, respectively, which are discussed elsewhere in this report.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of 1910 I continued the study of the Cambrian strata of the section of the Rocky Mountains adjacent to the main line of the Canadian Pacific Railway, special attention being given to the Stephen formation. The outcrop of this formation was carefully examined for many miles along the mountain sides, with the hope of finding a locality where conditions had been favorable for the preservation of the life of the epoch. The famous trilobite locality on the slope of Mount Stephen above Field had long been known and many species of fossils collected from it, but even there the conditions had not been favorable for the presence and preservation of examples of much of the life that, from what was known of older faunas and the advanced stage of development of the Upper Cambrian fauna, must have existed in the Middle Cambrian seas. The finding, during the season of 1909, of a block of fossiliferous siliceous shale that had been brought down by a snowslide on the slope between Mount Field and Mount Wapta led us to make a thorough examination of the section above in 1910. Every layer of limestone and shale above was examined, until we finally located the fossil-bearing band. After that for 30 days we quarried the shale, slid it down the mountain side in blocks to a trail, and transported it to camp on pack horses, where the shale was split, trimmed, and packed and then taken down to the railway station at Field, 3,000 feet below.

A number of sections of the Cambrian rocks were studied and measured in the mountains north and south of Laggan, Alberta, and many beautiful panoramic photographs secured.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

At the date of my last annual report the Institution contemplated an exhaustive biological survey of the Panama Canal Zone, and it was then hoped that definite plans would soon be completed and the survey undertaken within a few months. I am glad now to report that chiefly through the generosity of friends of the Institution the necessary funds for carrying on the work became available. With the cooperation of several of the executive departments, and of the Field Museum of Natural History, a party of about 10 naturalists was accordingly sent to the zone, and the results so far accomplished have been very satisfactory. Large collections of biological material have been received, including specimens of a considerable number of genera and species new to science.

Much interest is manifest in the survey both here and in the zone. The Republic of Panama was so impressed with the importance of the work that it invited the Institution to extend the survey within

the bounds of that country, which was done with gratifying results as far as the limited means and time permitted.

As stated in my last report, it seemed to be highly important to science that such a survey of the Canal Zone be made, for, although it was known in a general way that a certain number of species of animals and plants in the fresh-water streams on the Atlantic side of the Isthmus were different from those on the Pacific side, no definite knowledge of the extent of these differences had been acquired. It also seemed important to determine exactly the geographical distribution of the various organisms inhabiting the Isthmus, which is one of the routes by which the animals and plants of South America have entered North America and vice versa. When the Panama Canal is completed the organisms of the various watersheds will be offered a ready means of mingling together, the natural distinctions as regards distribution now existing will be obliterated, and the data for a true understanding of the fauna and flora will be placed forever out of reach. Moreover, a great fresh-water lake will be created by the construction of the Gatun Dam, and the majority of the animals and plants inhabiting that locality will be driven away or drowned, and quite possibly some species may be exterminated before they become known to science.

BIOLOGICAL EXPEDITION IN CANADA.

Through the courtesy of the Canadian Government and of Dr. A. O. Wheeler, president of the Alpine Club of Canada, the Smithsonian Institution was enabled to send a small party of naturalists to accompany Dr. Wheeler on his topographical survey of the British Columbia and Alberta boundary line and the Mount Robson region. The party started in June, 1911.

The region to be surveyed includes a most rugged and broken country in the midst of the Canadian Rockies, abounding in a great variety of animals and plants, and it is expected that the expedition will result in a large and valuable collection of birds, mammals, insects, and plants to be added to the National Museum series.

RAINEY EXPEDITION IN AFRICA.

Mr. Paul J. Rainey, of New York City, having planned a hunting and collecting trip of several months' duration in Africa, offered to present to the Institution the natural history material obtained during the trip if there could be sent with him some person skilled in the preparation of specimens. Mr. Rainey generously offered to bear all the expenses of the trip. The route of travel was to be north of that of the recent Smithsonian African expedition, through the country lying between the northern portion of British East Africa and the southern part of Abyssinia. Mr. Edmund Heller, who was

one of the field naturalists of the Smithsonian African expedition under the direction of Col. Roosevelt, was accordingly detailed to accompany Mr. Rainey, and letters have been received indicating very successful results.

BIRD STUDIES IN THE ALEUTIAN ISLANDS AND BERING SEA.

A small party of naturalists made a brief visit to the Aleutian Islands and Bering Sea during the season of 1911, chiefly in the interest of the Smithsonian Institution and the Biological Survey of the Department of Agriculture, especially for a study of land and marine birds. Through the cooperation of the Treasury Department the party was afforded transportation on the revenue cutter *Tahoma*.

The principal results of the visit were the collection of a good series of all the land birds of the islands visited, including a particularly fine series of ptarmigan, and a large number of eggs, and the securing of some interesting observations on the distribution and habits of the birds of that region. These observations will be made use of by Mr. A. C. Bent, who has undertaken to complete the work on the life histories of North American birds, two volumes of which, by the late Maj. Charles Bendire, have been published by the National Museum and the Smithsonian Institution.

ANTHROPOLOGICAL RESEARCHES IN PERU.

During the summer of 1910 Dr. Aleš Hrdlička, of the National Museum, visited the great ruins of the temples and city of Pachacamac, about 18 miles south of Lima, and also the ruins and cemeteries in the district of Trujillo, Peru, where he collected upward of 3,400 crania and a quantity of other skeletal parts. A large percentage of the gathered skulls are free from artificial deformation and therefore afford a much better opportunity than previous collections for a critical study of the peoples who centuries ago occupied and congregated in these regions.

Pachacamac was a religious center, much like the Egyptian Thebes and the Mohammedan Mecca, to which pilgrims flocked from all parts of Peru. After the destruction of the Temple of the Sun by the Spaniards, the place became a desolate pile of ruins, with from 60,000 to 80,000 graves of pilgrims who had come from widely separated regions. The Valley of Chicama, near Trujillo, with the neighboring country, was the seat of the powerful people known after one of their chiefs as Chimu.

As to the importance of the material collected, Dr. Hrdlička remarks:

Peru may well be regarded, even in its present territorial restrictions, as the main key to the anthropology of South America. Due to the numbers of its ancient inhabitants, and to their far-reaching social differentiations, indi-

ating long occupancy, a good knowledge of the people of Peru from the earliest times is very desirable, and would constitute a solid basis from which it would be relatively easy to extend anthropological comparison to all the rest of the native peoples of the southern continent. Such anthropological comparisons will be greatly facilitated by the collections acquired on this expedition.

Some of the interesting results of his work are described by Dr. Hrdlička in a pamphlet recently published by the Institution.

RESEARCHES UNDER THE HODGKINS FUND.

With a view to aiding in the establishment of an international scale for the measurement of solar radiation, as mentioned in my last report, a limited grant from the Hodgkins fund has been approved for the construction, in the Smithsonian workshops, of several silver disk pyrheliometers, after the design of Mr. C. G. Abbot, Director of the Smithsonian Astrophysical Observatory.

The International Solar Union has for some time been interested in the establishment of an international standard scale of radiation, and pyrheliometers of varying types have been in use at different observatories. The desire, however, for still another simple but accurate instrument seemed general, and the Institution has been gratified to learn that, by the use of the Abbot pyrheliometer, a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it have been promoted.

Arrangements have been made whereby the Abbot pyrheliometer is now in use in widely separated localities. There is one in the astronomical observatory established by Harvard College at Arequipa, Peru; another in the observatory at Teneriffe; and two have been sent to the minister of agriculture in Buenos Aires for meteorological stations in Argentina. The Department of Agriculture, the Bureau of Standards, and the United States Weather Bureau in Washington are supplied with the instruments; Prof. Chistoni, of the Royal University of Naples, has installed one there, and the Imperial College of Science and Technology at South Kensington, London, has secured one. Prof. Violle, of the National Observatory of Arts and Crafts, Paris, was among the first to install one of the Abbot instruments, and one has been sent to Dr. Hellmann, director of the Royal Prussian Meteorological Institute, Berlin. The University of Toronto, Canada, the University of Wisconsin, and the Central Physical Observatory of St. Petersburg also have them, and inquiries from other institutions as to the mode of securing them are frequent, so that the establishment of the desired international standard of estimating and recording the variations of solar radiation seems to have been already aided by the use of uniform instruments in many widely separated localities.

The distinguished specialists who form the committee on award for the examination of the memoirs submitted in the Hodgkins prize competition, announced in connection with the Congress on Tuberculosis of 1908, have not yet submitted their decision. This delay is regretted by the Institution as sincerely as by the competitors, but has seemed to be unavoidable as the large number of papers presented and their technical character make it very difficult to render a prompt decision.

Then, too, it is to be remembered that, according to the terms of the competition, the successful paper is to embody an original theory or discovery for the treatment of tuberculosis, not before published, a difficult task at a time when the attention of the medical world is so generally directed to the same subject.

The Langley Memoir on Mechanical Flight, the publication of which by the Hodgkins fund of the Institution was unfortunately delayed by causes beyond the control of the Institution, was completed just at the close of the fiscal year, as mentioned on another page.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

The Smithsonian Institution for 18 years past has maintained a table for the use of American biologists at the Naples Zoological Station. Exceptional opportunities are there afforded for the study of marine life, and it is believed that the cause of biological science has been thereby much advanced.

The application of Dr. R. S. Williams, of Miami University, mentioned in the Secretary's Report for 1910, was approved for March and April, 1911. Dr. Williams was chiefly occupied at Naples in ascertaining the rate of growth of recent encrusting organisms, especially bryozoans, with a view to the use of this information in researches on the Richmond division of the Ordovician period. The results thus far obtained by him he considers preliminary, and he proposes to continue the same research at some future time on a float anchored in the open sea.

In addition to his work on the bryozoan fauna, Dr. Williams secured a representative collection of the jaw apparatus of the free-swimming annelids belonging to the Eunicidea and the Glyceridea.

The appointment of Dr. Sergius Morgulis, a Parker Traveling Fellow from Harvard for 1911, was approved for the Smithsonian seat at Naples for the months of May, June, and July of this year.

Dr. C. W. Hargitt, of Syracuse University, a Smithsonian appointee at Naples for three months in 1903, was accorded a second occupancy during the present year. Several papers, among which

may be mentioned "The Hydromedusae of the Bay of Naples" and "Regeneration in *Rhizostoma pulmo*," were published by Dr. Hargitt as a result of his former appointment, and a report of his work during the present year is now in hand. He mentions with appreciation the cordial welcome accorded him by the director and staff of the laboratory, and the generosity with which the facilities for his work were provided.

Two papers embodying the results of Dr. Hargitt's recent investigations have been completed since his term at Naples, and are now in course of publication in the *Journal of Experimental Zoology*.

The application of Dr. Ch. Zeleny, associate professor of zoology in the University of Illinois, was approved for one month's occupancy, to cover part of June and July, 1911. No summary of the work accomplished during this period has yet been received from Dr. Zeleny.

When the same period is selected by more than one student the earliest application is considered first, the approval of the later ones becoming necessarily dependent on the ability of the station to provide for more than one Smithsonian appointee at the same time. It should be added that the obliging courtesy shown in this connection to appointees of the Smithsonian Institution by the director of the station often permits appointments to the seat which would otherwise be impracticable.

The prompt and efficient aid of the advisory committee in examining and reporting on applications for the table is still, as it has always been, of great service to the Institution and is very thoroughly appreciated.

PUBLICATIONS.

The Smithsonian Institution and its branches distributed during the past year nearly 200,000 copies of their various publications. These were sent chiefly to libraries and learned institutions throughout the world and to a limited list of specialists in the subjects discussed. It would be impracticable, without a very great increase in the size of the editions, to meet the popular demand for copies of Smithsonian publications. In the case, however, of the publications issued by the Government bureaus under direction of the Institution, which are printed under congressional appropriations, the law provides that they may be purchased by all who desire them at a slight advance over the cost of printing by application to the Superintendent of Documents.

It is through its publications that the Smithsonian Institution performs one of its principal functions—the diffusion of knowledge. Two series of works are issued by the Institution proper at the expense of the Smithsonian funds, namely, Smithsonian Contributions

to Knowledge, in quarto, and Smithsonian Miscellaneous Collections, in octavo form. The editions of these series are necessarily limited in number for distribution almost entirely to a carefully selected list of libraries throughout the world, where they may be readily consulted by students and investigators. There is also issued, at the cost of Government appropriations, an annual report, in the general appendix of which is included a considerable number of papers, either original or selected from more or less inaccessible sources, reviewing the progress and present condition of the natural and physical sciences and other branches of human knowledge. Although the edition of the report is considerable, yet the supply is each year exhausted within a very short time after its publication.

Contributions to Knowledge.—The Langley Memoir on Mechanical Flight, referred to in my last report, had been put to press and was nearly ready for distribution at the close of the fiscal year. This work forms a quarto volume of over 300 pages and a hundred plates. The memoir was in preparation at the time of Mr. Langley's death in 1906 and part of it had been written by him, bringing the work down to May, 1896, the date of his demonstration that a machine heavier than air could be made to fly under its own power. The account of later experiments, from 1897 to 1903, was written by Mr. Charles M. Manly, who became Mr. Langley's chief assistant in 1898.

Miscellaneous Collections.—Twenty papers on various subjects have been added to the series of Smithsonian Miscellaneous Collections, including descriptions of a number of new species of animals obtained by the Smithsonian African expedition and the biological survey of the Panama Canal Zone, and several papers, mentioned elsewhere, giving some results of my studies and field work in Cambrian geology and paleontology, besides an interesting paper by Dr. Hrdlička on his anthropological investigations in Peru.

Smithsonian Tables.—In connection with the system of meteorological observations established by the Smithsonian Institution about 1850, a series of meteorological tables was compiled by Dr. Arnold Guyot at the request of Secretary Henry, and the first edition was published in 1852. Though primarily designed for meteorological observers reporting to the Smithsonian Institution, the tables were so widely used by physicists that it seemed desirable to recast the entire work. It was decided to publish three separate sets of tables, each containing the latest knowledge in the field which it covered, but together forming a homogeneous series. The first of the new series, Meteorological Tables, was published in 1893; the second, Geographical Tables, in 1894; and the third, Physical Tables, in 1896. In 1909 another volume was added, so that the series now comprises: (a) Smithsonian Meteorological Tables, (b) Smithsonian Geographical Tables, (c) Smithsonian Physical Tables, and (d)

Smithsonian Mathematical Tables. Each of these works has been published in revised editions, with such corrections and additions as became necessary by the advance of scientific knowledge.

The years that had elapsed since the publication of the first edition of the Physical Tables in 1896 had brought such changes in the material upon which these tables must be based that it became necessary to almost wholly recast the work for the fifth revised edition, which was published during the past year. Recent data and many new tables have been added, including several mathematical tables especially computed for this work, which forms a volume of about 350 pages.

Opinions on Zoological Nomenclature.—As stated with some detail in my last report, the Institution cooperates with the International Commission on Zoological Nomenclature by providing clerical assistance for its secretary and by the publication of the commission's opinions. During the past year two pamphlets were issued containing opinions 1 to 25 and 26 to 29, covering important questions of nomenclature that had been matters of discussion among zoologists. In connection with the summary of each opinion there is printed a statement of the case and the discussion thereon by members of the commission. The rules to be followed in submitting cases for opinion¹ as laid down by the commission are as follows:

(1) The commission does not undertake to act as a bibliographic or nomenclatural bureau, but rather as an adviser in connection with the more difficult and disputed cases of nomenclature.

(2) All cases submitted should be accompanied by (a) a concise statement of the point at issue, (b) the full arguments on both sides in case a disputed point is involved, and (c) complete and exact bibliographic references to every book or article bearing on the point at issue.

The more complete the data when the case is submitted the more promptly can it be acted upon.

(3) Of necessity, cases submitted with incomplete bibliographic references can not be studied and must be returned by the commission to the sender.

(4) Cases upon which an opinion is desired may be sent to any member of the commission, but—

(5) In order that the work of the commission may be confined as much as possible to the more difficult and the disputed cases, it is urged that zoologists study the code and settle for themselves as many cases as possible.

Harriman Alaska series.—The Institution has received from Mrs. Edward H. Harriman several thousand copies of volumes descriptive of the results of the Harriman expedition to Alaska in 1899. The expedition was organized in cooperation with the Washington Academy of Sciences, but entirely at the expense of Mr. Harriman. He invited as his guests 3 artists and 25 men of science representing various branches of research. The expedition sailed from Seattle

¹ Cases should be forwarded to the secretary of the commission, Dr. Ch. Wardell Stiles, U. S. Hygienic Laboratory, Washington, D. C.

on May 30, 1899, on a special steamer, and was gone about two months, visiting the Aleutian Islands, the Pribilof Islands, and the Eskimo settlements on the Asiatic and American shores. The journey was extended through Bering Strait and return, and covered 9,000 miles. Large and important collections were made of mammals, birds, insects, marine animals, fossil shells, and fossil plants. Studies were also made of the great glaciers and of the geological formations of the regions visited. The contents of the volumes received by the Institution are enumerated by the editor in the appendix to the present report. The series consists of 11 volumes, printed and illustrated in the best manner. These books, now known as the Harri-man Alaska Series of the Smithsonian Institution, have been distributed, under special Smithsonian title pages, to a selected list of libraries throughout the world, the few copies of certain volumes remaining after such a distribution being held for sale in accordance with the terms of the agreement.

Museum publications.—The National Museum published its annual report, two volumes of proceedings and several bulletins, covering the usual wide range of subjects, but chiefly pertaining to zoology and botany.

Ethnological publications.—The Bureau of American Ethnology issued several bulletins, including part 2 of the Handbook of American Indians North of Mexico; part 1 of the Handbook of American Indian Languages; Antiquities of Central and Southeastern Mississippi Valley; Antiquities of the Mesa Verde National Park, and bulletins on other ethnological subjects.

Publications of historical and patriotic societies.—Annual reports of the American Historical Association and the National Society of the Daughters of the American Revolution were as usual communicated to Congress in accordance with law.

Advisory committee on printing and publication.—The committee on printing and publication has continued to examine manuscripts proposed for publication by the branches of the Institution, and has considered various questions concerning public printing and binding. Twenty-four meetings of the committee were held during the year and 115 manuscripts were passed upon. The personnel of the committee is as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Mr. C. G. Abbot, Director of the Astrophysical Observatory; Mr. W. I. Adams, disbursing officer of the Smithsonian Institution; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum;

and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the past fiscal year, aggregating \$72,700, were, as far as practicable, expended prior to June 30. The allotments for the year ending June 30, 1912, aggregating \$72,900, are as follows:

For the Smithsonian Institution, for printing and binding annual reports of the Board of Regents, with general appendices.....	\$10,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	34,000
For the annual reports and bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau....	21,000
For miscellaneous printing and binding:	
International exchanges.....	200
International Catalogue of Scientific Literature	100
National Zoological Park	200
Astrophysical Observatory.....	400
For the annual report of the American Historical Association.....	7,000
Total	72,900

LIBRARY.

The libraries of the Smithsonian Institution and of its several branches show an increase of about 18,000 volumes and pamphlets during the last year, being largely additions to the National Museum library and the Smithsonian deposit in the Library of Congress.

During the last five years improved methods and consolidation of work have been adopted in the interest of economy and efficiency, as discussed by the Assistant Secretary in the appendix to this report.

The library of the Bureau of Ethnology has been transferred from its former quarters in a rented building to the galleries of the main hall in the Smithsonian Building where it is much more convenient for reference, though the books are still arranged on temporary wooden shelves. It is hoped that this hall, which was originally planned for library purposes, may in the near future become available for such use. It is proposed, if necessary funds become available, to remove the wooden galleries, stairways, window sashes and frames, and book cases in this hall and substitute fireproof bookstacks, stairways, and windows. The new stacks and cases would accommodate the books belonging to the several bureaus under the direction of the Institution, including a part of the library of the National Museum, which should be kept in a central location. They would also provide a safe place to assemble the

Smithsonian books constantly used by the bureaus, of which several thousand are now scattered through various rooms in the Smithsonian Building.

LANGLEY MEMORIAL TABLET.

The memorial tablet authorized by the Regents to be erected in the Smithsonian building commemorative of the aeronautical work of the late Secretary Langley has not yet been completed. A design for the tablet has, however, been prepared and is under consideration by the committee appointed for the purpose.

INTERNATIONAL CONGRESSES AND CELEBRATIONS.

The Institution each year receives invitations to numerous scientific congresses and celebrations in the United States and abroad, but as funds are not available for the expenses of delegates few of these invitations can be accepted. In some instances, however, it is possible to arrange for representation by collaborators of the Institution who are visiting the localities on official or private business.

Congress of Americanists.—Dr. Aleš Hrdlička was appointed representative of the Smithsonian Institution and the National Museum and delegate on the part of the United States at the second session of the Seventeenth International Congress of Americanists, held in the Museo Nacional, Mexico City, September 8 to 14, 1910. He presented an account of his recent explorations in Peru, and also described the uncovering of an especially interesting sepulchre which he had been invited by the Mexican authorities to open in the ancient ruins of San Juan Teotihuacan.

The meeting was held in the Museo Nacional, and was well attended, especially by scientific men from the United States.

Dr. C. W. Currier, of Washington, was also designated delegate of the United States and a representative of the Smithsonian Institution at the above congress.

International American Scientific Congress.—Mr. Bailey Willis, as delegate on the part of the Smithsonian Institution, attended the International Scientific Congress which was held at Buenos Aires, Argentina, July 10 to July 25, 1910.

Geological Congress.—In August, 1910, the Eleventh International Geological Congress met in Stockholm. Dr. George F. Becker, of the United States Geological Survey, was a delegate on the part of the Smithsonian Institution. The congress was more largely attended than any of its predecessors, and nothing could exceed the hospitality of its reception. The principal subjects of discussion were the distribution and extent of the iron ore deposits of the world, Cambrian paleontology, and the change of climate since the last maximum of glaciation. To all of these subjects painstaking

contributions were made from every quarter of the globe, and the publications of the congress contain the most authoritative exposition of the present state of knowledge on these vital questions. Among the papers presented to the congress was one expressing my view on "the abrupt appearance of the Cambrian fauna."

Zoological Congress.—The Seventh International Zoological Congress was held at Graz, Austria, in August, 1910. The delegates on the part of the United States and the Smithsonian Institution and National Museum were Dr. H. H. Field, Dr. W. R. Kellicott, Dr. Ch. Wardell Stiles, and Mr. Austin H. Clark. About 600 members were present at this congress, of whom about 60 were from the United States, the majority of these representing scientific societies or educational institutions. To facilitate its labors, the congress was divided into sections, each section representing a definite subject or group of subjects. Papers of general interest were read in the Stephanien-salle, a large hall in the center of the city, while papers of more restricted scope were presented in the various lecture rooms of the university. Taken as a whole, the papers read were of a distinctly progressive nature, the authors, especially the younger ones, showing a marked disposition to depart from the time-honored and accepted lines of work and thought, and to approach their subjects from entirely new view points.

Congress of Bibliography and Documentation.—Mr. Paul Brockett, assistant librarian of the Institution, who was appointed a delegate to the International Congress of Bibliography and Documentation at Brussels, August 25 to 27, 1910, attended the congress and submitted a report on its proceedings, which is printed in the appendix.

Congress of Archivists and Librarians.—An International Congress of Archivists and Librarians was held at Brussels August 29 to 31, 1910, when the Institution was represented by Mr. Paul Brockett, whose report appears in the accompanying appendix.

MISCELLANEOUS.

Hambach collection of fossils.—The Institution has secured from Dr. Gustav Hambach, of St. Louis, a collection of about 20,000 specimens of fossil echinoderms and other animals, with more than 100 types. Almost all the fossils were collected in the Mississippi Valley and are the choicest obtainable. The series of Blastoids, a group of fossil echinoderms, is unique. The collection contains representatives of the various classes of animals, among which may be mentioned many insects from the Cenozoic formation in Colorado; many specimens of Paleozoic fishes, including an especially interesting series of teeth and spines; a complete series of fossil sea-urchins; the jaws of a Carboniferous batrachian over a foot long, and of a mastodon.

Chinese photographs.—The Institution has received a valuable series of large photographic negatives taken by Mr. Bailey Willis in connection with his geological work in China. These photographs represent scenery, particularly landscapes in which the loess formation is conspicuous, and also Chinese buildings, monuments, and the people themselves. The route of the expedition through the Provinces of Chihli, Shansi, and Shensi led through the district of the loess formation and some remote mountain regions of great interest and scenic beauty. Copies of many of these photographs have been furnished at cost to various institutions for educational purposes.

NATIONAL MUSEUM.

The most important item of interest in connection with the National Museum during the year was the completion on June 20, 1911, of all structural work on the new building, just six years after the excavations for the foundation were commenced. On another page the Assistant Secretary in charge of the Museum mentions the very superior character of the building for museum purposes. It is massive and imposing in appearance. It is well lighted. There is little room that can not be utilized. More than one-half of the 10 acres of floor space is placed at the service of the public in the interest of popular education, while the remaining space is used for reserve collections and laboratories of the scientific departments and divisions and for the maintenance of the building and the operation of the heating, lighting, and ventilating plant. The greater part of the natural-history collections, including ethnology, have been removed to the new structure; while in the old building space is now afforded for the proper display of objects pertaining to the arts and industries, including the collection illustrating the graphic arts and the art textiles, and also for the large and interesting series illustrative of American history. Although there has as yet been no formal dedication of the new building, the exhibition halls are being opened to the public one after another as the reinstallation of the exhibits progresses. It is planned in the near future to admit visitors to the new building, for a portion of the day at least, on Sundays in order that the people of Washington may be afforded a long-desired opportunity to study the national collections in their leisure hours.

The number of visitors to the new building during the year was 151,112 and to the old building 207,010.

The auditorium in the new building has been utilized for meetings of various scientific bodies and important lectures. The First American International Humane Congress was held there from October 10 to 15, 1910, and in connection therewith an interesting exhibit was displayed.

The accessions received by the Museum during the year include more than 200,000 specimens of animals and plants, besides 6,600 specimens relating to geology and paleontology, and about 17,000 anthropological objects. To the National Gallery of Art were added 94 paintings and engravings. In addition, about 1,600 objects of art and anthropology were accepted by the Museum as loans for exhibition. Among important accessions that merit special mention was a collection of 3,400 ancient crania, 6,000 bones, and 1,500 archeological objects, gathered chiefly in Peru by Dr. Hrdlička, as mentioned on another page. Other interesting archeological objects were received from the ancient pueblos of Arizona and New Mexico, besides a valuable series of skulls and skeletons from Arkansas and Mississippi. About 50,000 specimens of mollusks, collected in Alaska by Dr. William H. Dall between the years 1871 and 1899, were received during the year, together with many thousands of Japanese mollusks from the Imperial University of Japan.

Many other interesting accessions of objects of zoology, botany, geology, and anthropology are referred to by the Assistant Secretary in his report.

The paintings of the National Gallery of Art, exhibited in the middle hall of the new building, continue to attract much public attention. Mr. William T. Evans has added 13 canvases to his notable gift, which now comprises 127 pictures, representing 90 contemporary American painters.

Mr. Charles L. Freer has also added a large number of objects of oriental art to his most important gift to the Nation, the entire collection remaining, however, in his keeping at Detroit, Mich.

The great exhibition halls of the new building will afford opportunity for the proper display of the national collections illustrative of natural history, and especially such large and striking objects as groups of mammals, skeletons of fossil vertebrate animals, and groups representing the habits and customs of the races of mankind. The collections pertaining to the ethnology of America had increased year by year so rapidly in extent that they long ago outgrew the space that could be allotted to them in the old building. In the new structure they are installed with adequate regard to their size and importance.

The loan collection of laces and other art textiles has been largely increased numerically and in variety of contents under the able supervision of Mrs. James W. Pinchot, who initiated the movement.

The Museum has continued the distribution of collections of duplicate specimens to schools and colleges throughout the country. About 3,000 specimens, chiefly recent and fossil animals, were thus distributed during the year, and about 23,500 duplicate specimens were used in making exchanges.

Considerable progress has been made in arranging the large quantities of natural-history specimens collected by the Smithsonian African expedition and the Smithsonian biological survey of the Panama Canal Zone. Some of the African mammals of greatest public interest have been mounted in groups.

BUREAU OF AMERICAN ETHNOLOGY.

The Bureau of American Ethnology has been engaged for a number of years in scientific studies of the American aborigines, including their arts and industries, government, religious and sociological systems, and languages, as well as their mental and physical characteristics, their history, and antiquities. Much has been accomplished in this direction, and many of the results have been permanently recorded and disseminated by means of publication; but a large body of material still awaits final study and arrangement, and much work remains to be done both in the field and in the office.

The investigations of the bureau have, however, reached a stage at which it has been found possible to summarize some of the results in the form of handbooks, designed especially for the use of schools and unprofessional students. The demand for those already issued, or about to be published, is very large. Many changes are taking place among the Indians, owing to their advance in civilization, and for that reason the researches are being pressed with all possible speed while knowledge of primitive conditions is still available. The Indians form one of the great races of mankind, and the world properly looks to our Government to gather and record accurate knowledge of this branch of the human family, while by many the work of the Bureau of American Ethnology is regarded as the basis of American history.

One of the immediate demands upon the bureau is vigorous activity in the exploration and preservation of antiquities, especially in Arizona, Colorado, and New Mexico, before these important and most interesting ruins are entirely destroyed by vandalism or the elements.

Another important work that should speedily be undertaken is an ethnological study of the Indians and Eskimo of Alaska before the advent of greater numbers of white people shall have so modified them as to destroy their primitive character. So also there is need of further activity in the study of the few survivors of Indian tribes in the Middle West.

The bureau has conducted various lines of field work among the tribes which composed the Creek Confederacy of the Southern States; the Tewa Indians of the Rio Grande Valley, New Mexico;

the Winnebago Indians of Wisconsin and Nebraska; the Piegan, Blackfeet, Cheyenne, and Menominee Indians of the Algonquian family; the Chippewa Indians, especially with reference to their music; the Osage Indians, now in Oklahoma, and the Iroquois in New York.

A study of the past and present population of the Indians, with the various causes of their decrease is being conducted.

Some very interesting studies were made in Cuba, indicating that the western end of the island, including the Isle of Pines, was once inhabited by a cave-dwelling people of low culture and without agriculture. It is believed that these people were in that condition at the time of the visit of Columbus, and that they were the survivors of a cave-dwelling population once occupying all of Cuba and represented in Porto Rico and elsewhere in the West Indies.

The Smithsonian Institution, through its Bureau of American Ethnology in cooperation with the Archæological Institute of America, has carried on excavations in prehistoric cliff dwellings and pueblo ruins in New Mexico. In one locality these dwellings extend along the walls of a canyon for about 2 miles. In cooperation with the Colorado Cliff Dwellers' Association, the Institution excavated and repaired the celebrated Balcony House in Colorado. Excavations have also been made in newly discovered cliff dwellings and other archeological remains in northwestern Arizona.

INTERNATIONAL EXCHANGES.

An idea of the magnitude of the work conducted by this branch of the Institution may be obtained from the statement that 228,698 packages were handled during the year, an increase over the number for the preceding 12 months of 7,073. The weight of these packages was 560,808 pounds, a gain of 76,124 pounds.

The total available resources for carrying on this work were \$36,954.99, \$32,200 of which was appropriated by Congress, and \$4,754.99 was derived from the exchange repayments to the Institution.

Several changes made during the year in the routine of the Exchange Office have resulted in a more economical and efficient administration of the service.

It was stated in the last report that the German authorities had under consideration the founding in Berlin of an establishment to promote cultural relations between Germany and the United States, and that one of its functions would be to conduct on behalf of Germany the international exchange of publications which the Smithsonian Institution carries on for the United States. This establishment, which is known as the Amerika-Institut, was organized in the fall of 1910 and the exchange duties were assumed by it on January

1, 1911. The exchange agency maintained by the Smithsonian Institution in Leipzig was discontinued on the latter date.

Packages for Luxemburg and Roumania have heretofore been distributed through the Leipzig agency. Since its discontinuance the Amerika-Institut has been good enough to assume charge of the distribution of packages in Luxemburg, and the Academia Romana at Bucharest has been asked to act as the Roumanian exchange intermediary.

The Japanese Government has transferred the exchange agency of that country from the Department of Foreign Affairs to the Imperial Library at Tokyo. The regular series of United States official documents, which had been sent to the former for a number of years, has also been deposited in the Imperial Library.

The Government of the United Provinces of Agra and Oudh, Allahabad, India, has, at its request, been listed to receive a partial set of United States official publications, the total number of such depositories being now 34. The number of depositories of full sets of governmental documents remains the same as at the close of last year, namely, 55.

The Governments of the Argentine Republic, Denmark, and Great Britain have entered into the immediate exchange of their parliamentary record during the past year, 29 countries now taking part in this exchange with the United States.

Important collections of foreign publications have, through the efforts of the Exchange Office, been obtained during the past year for the Library of Congress and for several other establishments of the Government.

NATIONAL ZOOLOGICAL PARK.

The accessions to the Zoological Park during the past year were 335 animals, and the total number of animals on hand June 30, 1911, was 1,414, representing 376 species of mammals, birds, and reptiles, about 20 species being new to the park.

Among the important additions to the collections I may mention a pair of northern fur seals from Alaska, a hippopotamus, an East African buffalo, three prong-horn antelopes, a pair of reindeer, and a large Asiatic macaque monkey.

The number of visitors was 521,440, or a daily average of 1,428. As an indication of the educational value of the park, it may be mentioned that it was visited by 169 schools, classes, etc., with 4,966 pupils, an increase of about a thousand over the year preceding. While most of the classes were from the District of Columbia, some of them belonged in various parts of the country, including all the New England States, New York, Pennsylvania, and North Carolina.

The equipment of the Zoological Park, both as regards the accommodations for the collections and facilities for visitors, is still inadequate and is inferior to that of other establishments of the kind of equal importance.

Many of the animals are kept in temporary quarters that are insufficient in size, more or less insanitary, and quite costly to maintain. This is particularly true of the fine series of birds, which includes some of exceptional interest and rarity. The rough temporary building in which they are now kept is too small for the exhibition of the entire collection and the conditions are such that it is difficult to keep the birds in a good state of health. In a suitable structure the bird collection would be one of the most attractive features of the park.

Permanent paddocks are also needed for the hardy deer, wild sheep, goats, and cattle, which are now scattered in temporary inclosures, some of them altogether unsuitable.

A new bridge across Rock Creek is urgently needed to replace the present temporary log structure, and it should be of a permanent character and sufficiently wide to provide for the greatly increased travel when the valley of Rock Creek is fully developed.

The roadways and walks in the park were greatly improved at the cost of a special appropriation for that purpose. Nearly a mile of the roads were treated either by reshaping and supplying a top layer of stone or by regrading and furnishing the entire thickness of road-bed metal. About $1\frac{1}{4}$ miles of walks were also laid or repaired and steps were constructed where grades had before been too steep. A considerable amount of work was also done to provide proper drainage.

ASTROPHYSICAL OBSERVATORY.

The Astrophysical Observatory has been engaged in three principal lines of work during the year.

Observations by the spectrophotometric method were continued in order to confirm the view referred to in last year's report that the determinations of the intensity of the solar radiation outside the earth's atmosphere are independent of the observer's altitude above sea level, provided the conditions are otherwise good. Observations for the "solar constant" were accordingly taken on Mount Whitney in the summer of 1910, where opportunity was afforded also for measurements of the brightness of the sky by day and by night, the influence of the water vapor on the sun's spectrum, and the distribution of the sun's energy spectrum outside the atmosphere. The results of these observations show no discrepancy due to altitude between Mount Wilson (5,840 feet) and Mount Whitney (14,502 feet).

It also seemed important to confirm by further observation the variability of the solar constant of radiation. Observations were accordingly continued daily at Mount Wilson until November 10, 1910,

and renewed again on June 11, 1911, which tend to confirm the conclusion that the sun's output of radiation varies from day to day in a manner irregular in period and quantity. Assurance seems now complete that this latter result will be tested during the next fiscal year by long-continued daily observations taken simultaneously at two widely separated stations, where the atmosphere is believed to be specially favorable for such research. The definite determination of the laws governing the apparent variability of the "solar constant" it is expected will be of much value in the probable forecast of climatic conditions from year to year.

Measurements have also been made of the transparency, for long wave radiation, of columns of air containing known quantities of water vapor. This line of research promises highly interesting results.

As mentioned on another page, arrangements have been made with several observatories, widely separated through the world, for the use of the standard silver-disk secondary pyrheliometer designed by the director of the Smithsonian Astrophysical Observatory. It is hoped to thus secure not only uniformity of radiation measures, but also a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The International Catalogue of Scientific Literature publishes, through the cooperation of countries in all parts of the world, a current classified index to the literature of science. Seventeen volumes have been published annually, beginning with the literature of 1901. The organization consists of a central bureau in London and regional bureaus established in and supported by the 32 countries taking part in the enterprise. Supreme control of the catalogue is vested in an international convention, which met in London July, 1905, and July, 1910, and is to meet every tenth year hereafter. The second international convention met in London at the rooms of the Royal Society on July 12 and 13, 1910, and Mr. Leonard C. Gunnell, assistant in charge of the United States regional bureau, was sent by the Institution as the delegate from the United States. The convention decided that on account of the success already achieved by the International Catalogue and the great importance of the objects promoted, the enterprise would be continued. Attention was called to the urgent need of a permanent fund to aid in carrying on and extending the work. It was pointed out that although various regional bureaus for the collection of material were supported by the countries in which they were located, the maintenance of the central bureau for general administration and actual publication of the 17 annual volumes was dependent entirely on the funds derived from the sub-

scribers to the published volumes. Though every care has been used to edit and publish the work in the most economical way, the income of the central bureau has proved to be insufficient to meet current expenses and in addition pay interest on approximately \$35,000 of borrowed capital.

As a more detailed report of the work of the bureau and of the proceedings of the convention will be found in the appendix to this report, it will be sufficient here to call attention to the great value and importance of the work, and to say that it would be difficult to find an enterprise more deserving of endowment. A capital fund, yielding an annual income of from \$5,000 to \$10,000, would enable the central bureau not only to broaden the scope of the catalogue but also to reduce the subscription price now charged for the annual volumes. This charge is \$85 per year which, although not large when the amount of matter published is considered, is found to be far beyond the means of many who would otherwise be glad to avail themselves of this important aid to scientific research.

The Smithsonian Institution has a peculiar interest in the International Catalogue, for the reason that the original idea was conceived by the first Secretary of the Institution in 1855. The Royal Society through its Catalogue of Scientific Papers later partly carried out Secretary Henry's idea. Experience proved that the enterprise was too great for any one society, or, indeed, any one nation, to undertake, and the Smithsonian Institution, representing the United States, joined in the movement to make the work international.

The history of this international movement is briefly as follows:

The British foreign office in 1894, at the instance of the Royal Society, requested the United States Government, through the Department of State, to send delegates to a conference to be held in London in 1896. The matter was referred to the Smithsonian Institution, and the late Prof. Simon Newcomb and Dr. John S. Billings were sent as delegates. The second conference was held in 1898, and Dr. Cyrus Adler, librarian of the Smithsonian Institution, attended as a delegate.

In 1901, when success or failure depended on obtaining the co-operation of the United States in the enterprise, the Smithsonian Institution agreed to and did support a regional bureau from that time until 1906, when Congress made its first annual appropriation to carry on the work in this country. It will thus be seen that in each step the United States has, through the Smithsonian Institution, been prominent in the movement, and it would be a matter of much gratification if now that the enterprise has been so auspiciously started it could be further aided by an endowment fund originating in this country.

NECROLOGY.

MELVILLE WESTON FULLER.

It becomes my duty to record here the death of Chief Justice Melville Weston Fuller, Chancellor of the Smithsonian Institution, who was born at Augusta, Maine, February 11, 1833, and died at his summer home, Sorrento, Maine, July 4, 1910. For 22 years prior to his death, Chief Justice Fuller had been deeply interested in the welfare of the Institution, and only on one occasion was he absent from a meeting of the Regents during the entire period of his service as a member of the board.

During his long and useful life Justice Fuller served his country faithfully in several civil offices of trust and as Chief Justice of the Supreme Court of the United States. His achievements as a jurist were most adequately portrayed by the resolutions and eulogies pronounced in his memory at a meeting of members of the bar of the Supreme Court on December 10, 1910, and at the session of the Supreme Court on January 3, 1911.

The Board of Regents of the Smithsonian Institution expressed their sorrow in the following words of tribute adopted at the annual meeting of the board on December 8, 1910:

Whereas the Board of Regents of the Smithsonian Institution have received the sad intelligence of the death, on July 4, 1910, of Melville Weston Fuller, Chief Justice of the United States, and for twenty-two years chancellor of the Institution: Therefore be it

Resolved, That we desire here to record our profound sorrow at the severing of the tie that has bound us to him for so long a period of honored service; that we feel keenly the loss of a wise presiding officer, whose vast store of learning and gracious dignity have proved so invaluable in the deliberations of this board, and whose loyal interest in the Smithsonian Institution has been a source of inspiration to his colleagues.

Resolved, That we share in the grief of the Nation at the passing away of one who was at once a distinguished leader of the greatest legal tribunal of our land, an eminent jurist, a patriotic citizen, a shining example of Christian gentleness, and who also possessed so charming a personality as a man and as a friend.

Resolved, That we respectfully tender to the members of the family of our late associate our sincerest sympathy in their great bereavement.

Resolved, That an engrossed copy of these resolutions be transmitted to the family of the late chancellor.

Respectfully submitted,

CHARLES D. WALCOTT, *Secretary.*

APPENDIX I.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1911:

COMPLETION AND OCCUPATION OF THE NEW BUILDING.

It is gratifying to be able to report the completion of all structural work on the new building for the Museum on June 20, 1911, just six years after the excavations for its foundations were commenced. While the time limit originally estimated was somewhat exceeded on account of delays in the fulfillment of certain contracts, the work was purposely conducted slowly in order to insure entire stability and permanency of construction, which it is confidently believed have been secured. The building is massive and imposing in appearance, a notable addition to the group of Government structures at the Capital, and has already been proved to be admirably adapted to the purposes for which it was designed.

There is comparatively little room in the building that can not be utilized. Of the approximately 10 acres of floor space which it contains, fully one-half has been allotted to the public in the interest of popular education. The other half, after deducting the area required for the maintenance and operation of the building, is assigned to the storage of the reserve collections and to the laboratories. The occupation of the building did not await its final completion, but was begun during the summer of 1909, and has been continued as rapidly as the necessary furniture could be provided.

The work done on and in connection with the building during last year comprised the finishing of the rotunda, the south approaches, and the auditorium; the painting of the interior plastered walls and ironwork; and, under the direction of the officer in charge of public buildings and grounds, the grading and sodding of the grounds immediately surrounding the building and the construction of roads and walks leading to the several entrances.

By the close of the year essentially all of the reserve collections and all of the laboratories of the several divisions of anthropology, zoology, geology, and paleontology had been established in the new building, as had also most of the administrative offices which are to be located there. The collections had, moreover, been nearly all arranged in a manner convenient for study and reference, and in greater part had received their permanent systematic installation. Much remains to be done, however, in perfecting this arrangement and in completing the catalogues and indexes.

The exhibition collections had also been moved with the exception of the American mammals, the birds, the marine invertebrates, the osteological specimens, the fossil plants, the building stones, the gems, and a small section of ethnology. The only public installations that had been completed in the new building, besides the paintings of the National Gallery of Art, were, however, of ethnology, which occupied the sides and ends of the middle hall on the

main floor, and most of the two adjacent ranges. To these halls in greater or less part the public had been admitted from March 17, 1910, when the building was first opened. Work was actively progressing in the preparation of the exhibits for all of the other branches, the delays being due in large measure to the slow rate at which furniture was supplied, and had been well advanced for archeology, mineralogy, and the fossil vertebrates.

ADDITIONS TO THE COLLECTIONS.

The permanent acquisitions received during the year comprised approximately 228,642 specimens and objects, of which 204,540 were of animals and plants, 6,647 were geological and paleontological, 17,361 belonged to the several divisions included in the department of anthropology, and 94 were paintings and engravings presented to the National Gallery of Art. In addition, 1,629 objects of art and anthropology were accepted as loans for exhibition.

One of the most important accessions of the year resulted from an investigation in Argentina, conducted under the auspices of the Smithsonian Institution by Dr. Aleš Hrdlička, curator of physical anthropology, partly in conjunction with Mr. Bailey Willis as geologist, for the purpose of determining the nature and value of the evidence relating to man's antiquity in that country. The skeletal and archeological remains attributed to early man or his forerunners preserved in the museums were studied, the more important localities where such remains have been discovered were visited, and on the journey to and from Argentina short stops were made in Brazil, Peru, Panama, and Mexico. Some 3,400 ancient crania, 6,000 long and other bones, and 1,500 archeological objects of human manufacture composed the collection brought to Washington. A large number of prehistoric utensils, implements, ornaments, examples of weaving, etc., obtained by Dr. J. W. Fewkes during excavations in the Navaho National Monument and at the ancient Hopi pueblo of Wukoki at Black Falls, Little Colorado River, Ariz., were transferred by the Bureau of American Ethnology. Collections of a similar character, but including ancient human crania and skeletons, from the north-eastern pueblo region of New Mexico, were received from the School of American Archaeology of the Archaeological Institute of America, at Santa Fe, and a valuable series of skulls and skeletons from Arkansas and Mississippi was presented by Mr. Clarence B. Moore.

Two interesting ethnological collections, one from Liberia the other from Abyssinia, were lent for exhibition by Mr. George W. Ellis, jr., and Mr. Hoffman Philip, respectively, and a number of specimens relating to the Indians of North America were acquired by gift and purchase.

The final shipments from the Smithsonian African expedition, which arrived in the early part of the year, contained several thousand specimens of mammals, birds, reptiles, fishes, and mollusks. The notable collection of mammals belonging to Dr. C. Hart Merriam and consisting of about 5,800 skins, 6,000 skulls, and 100 complete skeletons, was secured through the generosity of Mrs. Edward H. Harriman, of New York, by whom it was purchased and donated to the Institution. The other principal additions of mammals were from British East Africa, Abyssinia, and China; while of birds the more important contributions were from North and Central America, the Philippine Islands, and China. The United States Biological Survey and the United States Bureau of Fisheries transmitted many reptiles from various parts of the United States and Mexico, and the latter also an interesting series from the Philippines. The fishes received were mainly from explorations by the Bureau of Fisheries in the eastern part of the United States. Large numbers of

Insects were deposited by the Bureau of Entomology, and important collections of hymenoptera were presented by Mr. S. A. Rohwer and Mr. P. R. Myers.

An especially noteworthy accession consisted of the collection of mollusks made in Alaska by Dr. William H. Dall while in the field for the United States Coast and Geodetic Survey, and later for the United States Geological Survey, between 1871 and 1899. It comprises about 15,000 lots and 50,000 specimens, and is undoubtedly the largest collection of the shells of moderate depths of water that has ever been assembled from that region. Another extensive contribution of mollusks, consisting of many thousands of Japanese specimens, was obtained from the Imperial University of Tokyo. Important type collections, recently described, of isopod crustaceans, medusæ, hydroids, and siphonophores, from explorations by the steamer *Albatross* in the Pacific Ocean and at the Philippine Islands, were transferred by the Bureau of Fisheries. Decapod crustaceans, representing a large number of species, were received from the Indian Museum at Calcutta; many isopods from several French explorations, including the Charcot expedition to the Antarctic Ocean, were obtained from the Muséum d'Histoire Naturelle at Paris; and an interesting series of recent crinoids was secured from the Zoological Museum at Copenhagen.

The collection of plants was increased by over 38,000 specimens, of which the largest contributions were from the biological survey of the Panama Canal Zone and the Department of Agriculture, though many specimens were obtained from the Bureau of Fisheries, and by gift and exchange. On the biological survey of the Canal Zone, which is being carried on under the auspices of the Smithsonian Institution, the Museum was represented during the year by one member of its staff, Mr. W. R. Maxon, assistant curator of plants. Mr. Maxon spent about two and one-half months in the field, working in conjunction with Mr. Henry Pittier, who is in charge of the botanical investigations, and in view of the richness of the region the exploration yielded exceedingly important results. Dr. J. N. Rose, associate curator of plants, and Dr. Paul Bartsch, assistant curator of mollusks, were members of an expedition by the Bureau of Fisheries steamer *Albatross*, which visited Guadaloupe Island, proceeded down the outer coast of Lower California and ascended the Gulf of California for a considerable distance. Valuable series of marine animals and of plants were secured, the former mostly by means of dredging, the latter during stops made along the coast.

The accessions in geology and mineralogy from the Geological Survey and other sources contained much interesting material and a number of type specimens. Especially important were several type series of Cambrian fossils described by Dr. Charles D. Walcott, and included in the noteworthy discoveries resulting from his recent explorations in British Columbia. Investigations in Kentucky and Tennessee by Dr. R. S. Bassler and Mr. Frank Springer yielded valuable collections of Silurian and Mississippian fossils. In vertebrate paleontology the more important additions consisted of mammalian and reptilian remains obtained in exchange.

An interesting series of articles of nickel produced by the late Joseph Wharton, of Philadelphia, who was recognized as the leader in the technology of this metal, was received as a donation from the executors of his estate. This collection, which had been preserved by Mr. Wharton in a cabinet at his home, comprises over 60 pieces, including pure nickel in several forms, harness and door trimmings, household utensils, forceps, magnetic needles, coinage blanks, etc., and is of much historical value.

The historical collection was greatly enriched, mainly by loans, and, by extending the exhibition space into a second hall, its installation has been much

improved. Rear Admiral R. E. Peary, United States Navy, retired, deposited the many medals conferred upon him by various geographical societies in recognition of his service to science in arctic exploration; the silver model of a ship and three loving cups presented to him; and two of the flags that he carried to the North Pole in 1909; all of which have been arranged together in a single case. Important additions to the collection of memorials of the Bailey-Myers-Mason family were received from Mrs. Julian James; valuable memorials of the Salter and Codwise families of colonial and revolutionary New York and New Jersey were lent by Miss Louise Salter Codwise; and interesting relics of the Schenck family of New Jersey dating back three generations were contributed by Dr. Clara S. Ludlow. The Gustavus Vasa Fox collection of Russian memorials was materially increased, and 11 pieces of furniture that once belonged to Gen. Rufus Putnam were received as a gift from his great-grandson, the late Judge E. M. P. Brister. An inhaler of the type used by Dr. William T. G. Morton in 1846, in the first operation which he performed with the use of ether as an anesthetic, and two busts of Dr. Morton were presented.

NATIONAL GALLERY OF ART.

The paintings of the National Gallery of Art continue to be exhibited in the large middle hall of the new building, the central part of which was specially fitted up for the purpose in 1910. While these quarters are already too restricted for the needs of the Gallery, the excellent lighting of this space makes possible an entirely satisfactory installation, which has attracted much attention.

Mr. William T. Evans, of New York, added 13 canvases to his notable collection of the works of contemporary American painters, which now comprises 127 pictures representing 90 artists. Mr. Evans also presented 81 examples of a series of 100 proofs designed to illustrate the work of the foremost American wood engravers, which he announced some time ago his intention to contribute. Mr. Charles L. Freer, whose important gift to the Nation of American and oriental art still remains in his keeping at Detroit, Mich., secured many valuable additions for his collection during an extended trip abroad, much of which was spent in China. The Gallery was fortunate in obtaining several interesting loans, including numerous examples of the paintings of early masters, and contributed to a number of important exhibitions held in other cities.

ART TEXTILES.

The loan collection of laces and other art textiles, which occupies one of the northern ranges in the older Museum building, was very largely increased both numerically and in the variety of its contents. Thirty-two loan contributions and three gifts, comprising 249 specimens, many of great beauty and value, brought the total number of specimens on exhibition up to 1,007. The supervision of the collection has been continued by Mrs. James W. Pinchot, to whose initiative and subsequent efforts, with the active cooperation of a number of ladies of Washington, the movement owes its success.

MISCELLANEOUS.

Of duplicate specimens taken from the collections, over 3,000, principally of recent animals and fossils, were distributed to schools and colleges, and about 23,500 were used in making exchanges. Approximately 24,600 specimens of various kinds were sent for study to specialists both in this country and abroad, mainly to be worked up and identified for the Museum.

The total number of visitors to the older Museum building was 207,010, to the Smithsonian building 167,085, and to the new Museum building 151,112. Considering that the buildings have been opened only during working hours on week days, this is to be regarded as a fair attendance. That it was smallest at the new building was owing to the fact that less than one-sixth of the exhibition space had been made ready for the public.

The publications issued comprised the annual report for 1910, two volumes of Proceedings, five bulletins, one volume of Contributions from the National Herbarium, and a large number of separate papers belonging to three unfinished volumes of Proceedings and two of Contributions. With the exception of the annual report, all were descriptive of material in the Museum collections. The number of copies of the various publications distributed was over 110,000.

By the addition of 6,127 books, pamphlets, and periodicals, the Museum library was increased to 40,211 volumes and 66,074 unbound publications.

The auditorium in the new building was used on several occasions for meetings of important scientific bodies. The sessions of the First American International Humane Congress, in connection with which an interesting exhibit was installed, were also held here from October 10 to 15, 1910.

The position of head curator of the department of biology, made vacant by the designation of Dr. F. W. True as an Assistant Secretary of the Institution on June 1, was filled by the appointment of Dr. Leonhard Stejneger, curator of reptiles and batrachians. For convenience of administration, the divisions of invertebrate paleontology, vertebrate paleontology, and paleobotany were combined, under the title of sections, in a single division of paleontology, with Dr. R. S. Bassler as curator.

Respectfully submitted.

RICHARD RATHBUN.

Assistant Secretary in Charge, U. S. National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

NOVEMBER 18, 1911.

APPENDIX II.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to present the following report on the operations of the Bureau of American Ethnology during the fiscal year ending June 30, 1911, conducted in accordance with the provisions of the act of Congress approved June 25, 1910, authorizing the continuation of ethnological researches among the American Indians and the natives of Hawaii, under the direction of the Smithsonian Institution, and in accordance with the plan of operations approved by the Secretary June 15, 1910. .

The systematic ethnological researches of the bureau were continued during the year with the regular scientific staff, consisting of nine ethnologists, as follows: Mr. F. W. Hodge, ethnologist in charge; Mr. James Mooney, Dr. J. Walter Fewkes, Mrs. Matilda Coxe Stevenson, Mr. J. N. B. Hewitt, Dr. John R. Swanton, Dr. Truman Michelson, Dr. Paul Radin, and Mr. Francis La Flesche. In addition the services of several specialists in their respective fields were enlisted for special work, as follows:

Dr. Franz Boas, honorary philologist, with several assistants, for research in connection with the preparation and publication of the Handbook of American Indian Languages.

Miss Alice C. Fletcher and Mr. Francis La Flesche, for the final revision of the proofs of their monograph on the Omaha Indians for publication in the twenty-seventh annual report.

Miss Frances Densmore, for researches in Indian music.

Mr. J. P. Dunn, for studies of the tribes of the Middle West.

Mr. John P. Harrington, for researches among the Mohave Indians of the Colorado Valley.

Rev. Dr. George P. Donehoo, for investigations in the history, geography, and ethnology of the tribes of Pennsylvania for incorporation in the Handbook of American Indians.

Mr. William R. Gerard, for studies of the etymology of Algonquian place and tribal names and of terms that have been incorporated in the English language for use in the same work.

Prof. H. M. Ballou, for bibliographic research in connection with the compilation of the List of Works Relating to Hawaii.

Mr. James R. Murie, for researches pertaining to the ethnology of the Pawnee Indians.

The systematic ethnological researches by members of the regular staff of the bureau may be summarized as follows:

Mr. F. W. Hodge, ethnologist in charge, in addition to conducting the administrative work of the bureau, devoted attention, with the assistance of Mrs. Frances S. Nichols, to the final revision of the remaining proofs of Part 2 of the Handbook of American Indians (Bulletin 30), which was published in January, 1911. This work met with such great popular demand that the edition of the two parts became exhausted immediately after publication, causing the bureau much embarrassment owing to the thousands of requests that it has

not been possible to supply. To meet this need in part, the Senate, on May 12, adopted a concurrent resolution authorizing the reprinting of the entire handbook, and at the close of the fiscal year the resolution was under consideration by the Committee on Printing of the House of Representatives. The Superintendent of Documents has likewise been in receipt of many orders for the work, necessitating the reprinting of part 1 some months after its appearance, and about the close of the fiscal year another reprint of this part was contemplated. Much material for incorporation in a revised edition for future publication was prepared during the year, but lack of funds necessary for the employment of special assistants prevented the prosecution of this work as fully as was desired.

The bureau has been interested in and has conducted archeological explorations in the Pueblo region of New Mexico and Arizona for many years. Since the establishment of the School of American Archaeology in 1907, following the revival of interest in American archeology, by the Archeological Institute of America, that body likewise commenced systematic work in the archeology of that great region. In order to avoid duplication of effort, arrangements were made between the bureau and the school for conducting archeological investigations in cooperation, the expense of the field work to be borne equally, a moiety of the collections of the artifacts and all the skeletal remains to become the property of the National Museum, and the bureau to have the privilege of the publication of all scientific results.

Active work under this joint arrangement was commenced in the Rito de los Frijoles, northwest of Santa Fé, New Mexico, in July, 1910, work having already been initiated there during the previous summer by the school independently, under the directorship of Dr. Edgar L. Hewett. In August, 1910, Mr. Hodge visited New Mexico for the purpose of participating in the work on the part of the bureau, and remained in the field for a month.

The great prehistoric site in the Rito de los Frijoles is characterized by an immense circular many-celled pueblo ruin, most of the stone walls of which are still standing to a height of several feet, and a series of cavate dwellings hewn in the soft tufa throughout several hundred yards of the northern wall of the canyon. Accompanying the great community ruin and also the cavate dwellings are underground kivas, or ceremonial chambers. In front of the cavate lodges were originally structures of masonry built against the cliff and forming front rooms, but practically the only remains of these are the foundation walls and the rafter holes in the cliff face. The debris covering these structures has been largely cleared away and the foundations exposed, and the walls of about two-thirds of the great pueblo structure in the valley have been bared by excavation. At the western extremity of the canyon, far up in the northern wall, is a natural cavern, known as Ceremonial Cave, in which are a large kiva, remarkably well preserved, and other interesting remains of aboriginal occupancy. This great archeological site in the Rito de los Frijoles is important to the elucidation of the problem of the early distribution of the Pueblos of the Rio Grande Valley, and there is reason to believe that when the researches are completed much light will be shed thereon. There is a paucity of artifacts in the habitations uncovered, aside from stone implements, of which large numbers have been found.

At the close of the work in the Rito de los Frijoles the joint expedition proceeded to the valley of the Jemez River, near the Hot Springs, where a week was spent in excavating the cemetery of the old Jemez village of Giusiwa. About 30 burials were disinterred here, and a few accompaniments of pottery vessels and other artifacts were recovered; but in the main the deposits had been completely destroyed by aboriginal disturbance, caused in part by covering the burials with heavy stones and partly by displacing the skeletons pre-

vously buried when subsequent interments were made. Giusiwa was inhabited in prehistoric times and also well within the historical period, as is attested by its massive, roofless church, built about the beginning of the seventeenth century. Nevertheless, no indication of Spanish influence was found in the ancient cemetery, and it is assumed that burial therein ceased with the coming of the missionaries and the establishment of the campo santo adjacent to the church. All collections gathered at Giusiwa have been deposited in the National Museum.

Other immense ruins on the summits of the mesas bounding the valley on the west were examined with the view of their future excavation. The exact position of the Jemez tribe among the Pueblo peoples is a problem, and both archeological and ethnological studies thereof are essential to its determination.

On completing this reconnoissance excavation was conducted in a cemetery at the great stone pueblo of Puye, on a mesa 8 miles west of the Tewa village of Santa Clara. About 50 burials were exhumed and sent to the National Museum, but artifacts were not found in abundance here, and as a rule they are not excellent in quality. In the joint work in the Rito de los Frijoles the expedition was fortunate in having the cooperation of Prof. Junius Henderson and Prof. W. W. Robbins, of the University of Colorado at Boulder, who, respectively, while the excavations were in progress, conducted studies in the ethno-zoology and the ethno-botany of the Tewa Indians, and also on the influence of climate and geology on the life of the early inhabitants of the Rito de los Frijoles. At the same time Mr. J. P. Harrington continued his researches in Tewa geographic nomenclature and cooperated with Professors Henderson and Robbins in supplying the native terms for plants and animals used by these Indians as food and medicine in ceremonies and for other purposes. The expedition was also fortunate in having the services of Mr. Sylvanus G. Morley in connection with the excavations in the Rito, of Mr. K. M. Chapman in the study of the decoration of the pottery and of the pictographs of the entire upper Rio Grande region, of Mr. Jesse L. Nusbaum in the photographic work, and of Mr. J. P. Adams in the surveying. Valued aid was also rendered by Messrs. Neil M. Judd, Donald Beauregard, and Nathan Goldsmith.

The scientific results of the joint research are rapidly nearing completion and will be submitted to the bureau for publication at an early date.

Throughout almost the entire year Mr. James Mooney, ethnologist, was occupied in the office in compiling the material for his study of Indian population covering the whole territory north of Mexico from the first white occupancy to the present time. By request of the Nebraska State Historical Society he was detailed in January, 1911, to attend the joint session of that body and the Mississippi Valley Historical Association, at Lincoln, Nebraska, where he delivered three principal addresses bearing particularly on the method and results of the researches of the bureau with the view of their application in local historical and ethnological investigations.

On June 4 Mr. Mooney started for the reservation of the East Cherokee in North Carolina to continue former studies of the sacred formulas and general ethnology of that tribe, and was engaged in this work at the close of the month.

At the beginning of the fiscal year Dr. J. Walter Fewkes, ethnologist, was in northern Arizona examining the great cave pueblos and other ruins within the Navaho National Monument. He found that since his visit in 1909 considerable excavation had been done by others in the rooms of Betatakin, and that the walls of Kitsuil, the other large cliff ruin, were greatly in need of repair. Guided by resident Navaho, he visited several hitherto undescribed cliff dwellings and gathered a fairly good collection of objects illustrating prehistoric culture of this part of northern Arizona, which have been deposited in the

National Museum. In order to facilitate the archeological work and to make the region accessible to students and visitors it was necessary to break a wagon road from Marsh Pass through the middle of the Navaho National Monument to the neighborhood of Betatakin, and by this means the valley was traversed with wagons for the first time.

On the return journey to Flagstaff, Dr. Fewkes visited the ruins in Nitsi, or West Canyon, and examined Inscription House, a prehistoric cliff dwelling of considerable size, hitherto undescribed, the walls of which are built of loaf-shaped adobes strengthened with sticks. On account of the size and great interest of these ruins, it is recommended that the area covered thereby be included in the Navaho National Monument and the ruins permanently preserved, and that either Betatakin or Kitsiel be excavated, repaired, and made a "type ruin" of this culture area. Along the road to Flagstaff from West Canyon, Dr. Fewkes observed several ruins and learned of many others ascribed to the ancient Hopi. He visited the Hopi pueblo of Moenkopi, near Tuba, and obtained considerable new ethnological material from an old priest of that village regarding legends of the clans that formerly lived in northern Arizona. He learned also of a cliff, or rock, covered with pictographs of Hopi origin, at Willow Spring, not far from Tuba, the figures of which shed light on Hopi clan migration legends.

Returning to Flagstaff, Dr. Fewkes reoutfitted in order to conduct investigations of the ruins near Black Falls of the Little Colorado River, especially the one called Wukoki, reputed to have been the last habitation of the Snake clans of the Hopi in their southern migration before they finally settled near the East Mesa. A little more than a month was spent at these ruins, during which time extensive excavations were made in numerous subterranean rooms, or pit dwellings, a new type of habitations found at the bases of many of the large ruined pueblos on the Little Colorado. Incidentally several other pueblo ruins, hitherto unknown, with accompanying reservoirs and shrines, were observed. The excavations at Wukoki yielded about 1,800 specimens, consisting of painted pottery, beautiful shell ornaments, stone implements, basketry, wooden objects, cane "cloud blowers," prayer sticks, a prayer-stick box, an idol, and other objects. The results of the excavations at Wukoki will be incorporated in a forthcoming bulletin on Antiquities of the Little Colorado Basin.

On the completion of his work at the Black Falls ruins, Dr. Fewkes returned to Washington in September and devoted the next three months to the preparation of a monograph on Casa Grande, Arizona.

At the close of January, 1911, Dr. Fewkes again took the field, visiting Cuba for the purpose of gathering information on the prehistoric inhabitants of that island and their reputed contemporaneity with fossil sloths, sharks, and crocodiles. A fortnight was devoted to the study of collections of prehistoric objects in Habana, especially the material in the University Museum from caves in Puerto Principe Province, described by Drs. Montané and Carlos de la Torre. With this preparation he proceeded to the Isle of Pines and commenced work near Nueva Gerona. In this island there are several caves from which human bones have been reported locally, but the Cueva de los Indios, situated in the hills about a mile from the city named, promised the greatest reward. A week's excavation in this cave yielded four fragments of Indian skulls, not beyond repair; one undeformed, well-preserved, human cranium; and many fragments of pelves, humeri, and femora. The excavations in the middle of the cave indicated that the soil there had previously been dug over; these yielded little of value, the best-preserved remains occurring near the entrance, on each side. The skulls were arranged in a row within a pocket sheltered by

an overhanging side of the cave, and were buried about 2 feet in the guano and soil; beneath these crania were human long-bones, crossed. Several fragments of a single skull or of several skulls were embedded in a hard stalagmitic formation over the deposit of long-bones. No Indian implements or pottery accompanied the bones, and no fossils were found in association with them. So far as recorded this is the first instance of the finding of skeletal remains of cave man in the Isle of Pines. Their general appearance and mode of burial were the same as in the case of those discovered by Drs. Montoné and Carlos de la Torre.

Dr. Fewkes also examined, in the Isle of Pines, about 30 structures known as *cacimbas*, their Indian name. These are vase-shaped, subterranean receptacles, averaging 6 feet in depth and 4 feet in maximum diameter, generally constricted to about 2 feet at the neck, and with the opening level with the surface of the ground. Although these *cacimbas* are generally ascribed to the Indians, they are thought by some to be of Spanish origin, and are connected by others with buccaneers, pirates, and slavers. They are built of masonry or cut in the solid rock; the sides are often plastered and the bottoms commonly covered with a layer of tar. On the ground near the openings there is generally a level, circular space, with raised periphery. The whole appearance supports the theory that these structures were used in the manufacture of turpentine or tar, the circular area being the oven and the *cacimba* the receptacle for the product.

Dr. Fewkes found that the *Pineros*, or natives of the island, employ many aboriginal terms for animals, plants, and places, and in some instances two Indian words are used for the same object. An acknowledged descendant of a Cuban Indian explained this linguistic duality by saying that the Indians of the eastern end of the Isle of Pines spoke a dialect different from those of the western end, and that when those from Camaguey, who were Tainan and of eastern Cuban origin, came to the Isle of Pines at the instance of the Spanish authorities they brought with them a nomenclature different from that then in use on that island.

Several old Spanish structures of masonry, the dates of which are unknown, were also examined in the neighborhood of Santa Fé, Isle of Pines. The roof of a cave at Punta de Este, the southeastern angle of the island, bears aboriginal pictographs of the sun and other objects, suggesting that it is comparable with the cave in Haiti, in which, in Indian legend, the sun and the moon originated and from which the races of man emerged.

Dr. Fewkes has now collected sufficient material in Cuba to indicate that its western end, including the Isle of Pines, was once inhabited by a cave-dwelling people, low in culture and without agriculture. His observations support the belief that this people were in that condition when Columbus visited the Isle of Pines and that they were survivors of the *Guanahatibibes*, a cave-dwelling population formerly occupying the whole of Cuba and represented in Porto Rico and other islands of the West Indies.

Dr. Fewkes also visited several of the coral keys southwest of Isle of Pines, but, finding no aboriginal traces, he crossed the channel to Cayman Grande, about 250 miles from Nueva Gerona. The Cayman group consists of coral islands built on a submarine continuation of the mountains of Santiago Province, Cuba. A cave with Indian bones and pottery, probably of Carib origin, was found near Boddentown on the eastern end of the island, and a few stone implements were obtained from natives, but as these specimens may have been brought from adjacent shores they afford little evidence of a former aboriginal population of Cayman Grande. The elevation of the Cayman Islands, computed from the annual accretion, would indicate that Cayman

Grande was a shallow reef when Columbus visited Cuba, and could not have been inhabited at that time. The discoverer passed very near it on his second voyage, when his course lay from the Isle of Pines to Jamaica, but he reported neither name nor people.

Dr. Fewkes returned to Washington in April and spent the remainder of the year in completing his report on Casa Grande.

Dr. John R. Swanton, ethnologist, devoted the first quarter of the year chiefly to collecting material from libraries and archives, as the basis of his study of the Creek Indians. From the latter part of September until early in December he was engaged in field research among the Creek, Natchez, Tonkawa, and Alibamu Indians in Oklahoma and Texas, and also remained a short time with the remnant of the Tunica and Chitimacha in Louisiana, and made a few side trips in search of tribes which have been lost to sight within recent years. On his return to Washington, Dr. Swanton transcribed the linguistic and ethnologic material collected during his field excursion, read the proofs of *Bulletins* 44, 46, and 47, added to the literary material regarding the Creek Indians, collected additional data for a tribal map of the Indians of the United States, and initiated a study of the Natchez language with the special object of comparing it with the other dialects of the Muskogean family. Dr. Swanton also spent some time in studying the Chitimacha and Tunica languages.

From July, 1910, until the middle of April, 1911, Mrs. M. C. Stevenson, ethnologist, was engaged in the completion of a paper on Dress and Adornment of the Pueblo Indians, in the elaboration of her report on Zuni Plants and Their Uses, and in transcribing her field notes pertaining to Zuni religious concepts and the mythology and ethnology of the Taos Indians.

Mrs. Stevenson left Washington on April 12 and proceeded directly to the country of the Tewa Indians, in the valley of the Rio Grande in New Mexico, for the purpose of continuing her investigation of those people. Until the close of the fiscal year her energies were devoted to the pueblo of San Ildefonso and incidentally to Santa Clara, information particularly in regard to the Tewa calendar system, ceremonies, and material culture being gained. Mrs. Stevenson finds that the worship of the San Ildefonso Indians includes the same celestial bodies as are held sacred by the Zuni and other Pueblos. From the foundation laid during her previous researches among the Tewa, Mrs. Stevenson reports that she has experienced little difficulty in obtaining an insight into the esoteric life of these people, and is daily adding to her store of knowledge respecting their religion and sociology. A complete record of obstetrical practices of the Tewa has been made, and it is found that they are as elaborate as related practices of the Taos people. The San Ildefonso inhabitants do not seem to have changed their early customs regarding land tenure, and they adhere tenaciously to their marriage customs and birth rites, notwithstanding the long period during which missionaries have been among them. It is expected that, of her many lines of study among the Tewa tribes, the subject of their material culture will produce the first results for publication.

After completing some special articles on ethnologic topics for the closing pages of Part 2 of the Handbook of American Indians, Mr. J. N. B. Hewitt, ethnologist, pursued the study of the history of the tribes formerly dwelling in the Susquehanna and upper Ohio valleys. Progress in these researches was interrupted by the necessity of assigning him to the editorial revision and annotation of a collection of 120 legends, traditions, and myths of the Seneca Indians, recorded in 1884 and 1885 by the late Jeremiah Curtin. At the close of the year this work was far advanced, only about 150 pages of a total of 1,400 pages remaining to be treated. It is designed to publish this material.

with Mr. Hewitt's introduction, notes, and explanatory matter, in a forthcoming annual report. As opportunity afforded, Mr. Hewitt also resumed the preparation of his sketch of the grammar of the Iroquois for incorporation in the Handbook of American Indian Languages.

As in previous years, Mr. Hewitt prepared and collected data for replies to numerous correspondents requesting special information, particularly in regard to the Iroquois and Algonquian tribes. Mr. Hewitt also had charge of the important collection of 1,716 manuscripts of the bureau, cataloguing new accessions and keeping a record of those withdrawn in the progress of the bureau's researches. During the year, 378 manuscripts were thus made use of by the members of the bureau and its collaborators. Exclusive of the numerous manuscripts prepared by the staff of the bureau and by those in collaboration with it, referred to in this report, 12 items were added during the year. These pertain to the Pawnee, Chippewa, Zuni, and Tewa tribes, and relate to music, sociology, economics, and linguistics.

The beginning of the fiscal year found Dr. Truman Michelson, ethnologist, conducting ethnological and linguistic investigations among the Piegan Indians of Montana, whence he proceeded to the Northern Cheyenne and Northern Arapaho, thence to the Menominee of Wisconsin, and finally to the Micmac of Restigouche, Canada—all Algonquian tribes, the need of a more definite linguistic classification of which has long been felt. Dr. Michelson returned to Washington at the close of November and immediately commenced the elaboration of his field notes, one of the results of which is a manuscript bearing the title "A Linguistic Classification of the Algonquian Tribes," submitted for publication in the twenty-eighth annual report. Also in connection with his Algonquian work Dr. Michelson devoted attention to the further revision of the material pertaining to the Fox grammar, by the late Dr. William Jones, the outline of which is incorporated in the Handbook of American Indian Languages. During the winter Dr. Michelson took advantage of the presence in Washington of a deputation of Chippewa Indians from White Earth, Minnesota, by enlisting their services in gaining an insight into the social organization of that tribe and also in adding to the bureau's accumulation of Chippewa linguistic data. Toward the close of June, 1911, Dr. Michelson proceeded to the Sauk and Fox Reservation in Iowa for the purpose of continuing his study of that Algonquian group.

The months of July and August and half of September, 1910, were spent by Dr. Paul Radin, ethnologist, among the Winnebago Indians of Nebraska and Wisconsin, his efforts being devoted to a continuation of his studies of the culture of those people, with special reference to their ceremonial and social organization and their general social customs. Part of the time was devoted to a study of the Winnebago material culture, but little progress was made in this direction, as few objects of aboriginal origin are now possessed by these people, consequently the study must be completed by examination of their objects preserved in museums and private collections. A beginning in this direction was made by Dr. Radin during the latter half of September and in October at the American Museum of Natural History, New York City. During the remainder of the fiscal year Dr. Radin was engaged in arranging the ethnological material gathered by him during the several years he has devoted to the Winnebago tribe, and in the preparation of a monograph on the Medicine Ceremony of the Winnebago and a memoir on the ethnology of the Winnebago tribe in general. In June, 1911, he again took the field in Wisconsin for the purpose of obtaining the data necessary to complete the tribal monograph. Both these manuscripts, it is expected, will be finished by the close of the present calendar year.

By arrangement with the Commissioner of Indian Affairs the bureau was fortunate in enlisting the services of Mr. Francis La Flesche, who has been frequently mentioned in the annual reports of the bureau in connection with his studies, jointly with Miss Alice C. Fletcher, of the ethnology of the Omaha tribe of the Siouan family. Having been assigned the task of making a comparative study of the Osage tribe of the same family, Mr. La Flesche proceeded to their reservation in Oklahoma in September. The older Osage men, like the older Indians generally, are very conservative, and time and tact were necessary to obtain such standing in the tribe as would enable him to establish friendly relations with those to whom it was necessary to look for trustworthy information. Although the Osage language is similar to that of the Omaha, Mr. La Flesche's native tongue, there are many words and phrases that sound alike but are used in a different sense by the two tribes. Having practically mastered the language, Mr. La Flesche was prepared to devote several months to what is known as the No''ho'zhi''ga Ie'ta, the general term applied to a complex series of ceremonies which partake of the nature of degrees, but are not, strictly speaking, successive steps, although each one is linked to the other in a general sequence. While at the present stage of the investigation it would be premature to make a definite statement as to the full meaning and interrelation of these Osage ceremonies, there appear to be seven divisions of the No''ho'zhi''ga Ie'ta, the names, functions, and sequence of which have been learned, but whether the sequence thus far noted is always maintained remains to be determined. From Saucy-Calf, one of the three surviving Osage regarded as past masters in these ceremonies, phonographic records of the first of the ceremonies, the Waxo'be-awatho'', have been made in its entirety, consisting of 80 songs with words and music, and 7 prayers. All these have been transcribed and in part translated into English, comprising a manuscript exceeding 300 pages. In order to discuss with the Osage the meaning of these rituals, Mr. La Flesche found it necessary to commit them to memory, as reading from the manuscript disconcerted the old seer. At Saucy-Calf's invitation Mr. La Flesche witnessed in the autumn, at Grayhorse, a performance of the ceremony of the Waxo'be-awatho'', the recitation of the rituals of which requires one day, part of a night, and more than half of the following day. It is Mr. La Flesche's purpose to record, if possible, the rituals of the remaining six divisions of the No''ho'zhi''ga Ie'ta. He has already obtained a paraphrase of the seventh ceremony (the Nik'ino'k'o''), and hopes soon to procure a phonographic record of all the rituals pertaining thereto.

In connection with his ethnological work Mr. La Flesche has been so fortunate as to obtain for the National Museum four of the waxo'be, or sacred packs, each of which formed a part of the paraphernalia of the No''ho'zhi''ga Ie'ta, as well as a waxo'be-to''ga, the great waxo'be which contains the instruments for tattooing. Only those Osage are tattooed who have performed certain acts prescribed in the rites of the No''ho'zhi''ga Ie'ta. The rites of the tattooing ceremony are yet to be recorded and elucidated. While the waxo'be is the most sacred of the articles that form the paraphernalia of the No''ho'zhi''ga Ie'ta rites, it is not complete in itself; other things are indispensable to their performance, and it is hoped that these may be procured at some future time.

While not recorded as one of the ceremonial divisions of the No''ho'zhi''ga Ie'ta, there is a ceremony so closely connected with it that it might well be regarded as a part thereof—this is the Washa'beathi'' watsi, or the dance of the standards. The introductory part of this ceremony is called Akixage, or weeping over one another in mutual sympathy by the members of the two great divisions of the tribe. There is no regular time for the performance of the Washa'beathi''n ceremony. It is given only when a member of the tribe loses

by death some specially loved and favored relative and seeks a ceremonial expression of sympathy from the entire tribe. It is the intention to procure the songs and rituals of this ceremony, and specimens of the standards employed in its performance.

Altogether Mr. La Flesche has made excellent progress in his study of the Osage people, and the results are already shedding light on the organization and the origin and function of the ceremonies of this important tribe.

The special researches of the bureau in the field of linguistics were conducted by Dr. Franz Boas, honorary philologist, one of the immediate and tangible results of which was the publication of Part 1 of the Handbook of American Indian Languages. It seems desirable to restate at the present time the development of the plan and the object of this work.

Through the efforts of the late Maj. Powell and his collaborators a great number of vocabularies and a few grammars of American Indian languages had been accumulated, but no attempt had been made to give a succinct description of the morphology of all the languages of the continent. In order to do this, a series of publications was necessary. The subject matter had to be represented by a number of grammatical sketches, such as are now being assembled in the Handbook of American Indian Languages. To substantiate the inductions contained in this grammar, collections of texts are indispensable to the student, and finally a series of extended vocabularies are required. The plan, as developed between 1890 and 1900, contemplated the assembling in the bulletin series of the bureau of a series of texts which were to form the basis of the handbook. Of this series, Dr. Boas's Chinook, Kathlamet, and Tsimshian Texts, and Swanton's Haida and Tlingit Texts, subsequently published, form a part, but at the time Swanton's Texts appeared it was believed by Secretary Langley that material of this kind was too technical in character to warrant publication in a governmental series. It was, therefore, decided to discontinue the text series in the bulletins of the bureau and to divert them to the Publications of the American Ethnological Society and the Columbia University Contributions to Anthropology. Other series were commenced by the University of California and the University of Pennsylvania. The method of publication pursued at the present time, though different from that first planned, is acceptable, since all the material is accessible to students, and the bureau is saved the expense of publication.

Dr. Boas has been enabled to base all the sketches in the first volume of his handbook on accompanying text series, as follows:

- (1) Athapaskan. Text published by the University of California.
- (2) Tlingit. Text published by the Bureau of American Ethnology, but too late to be used systematically.
- (3) Haida. Texts published by the Bureau of American Ethnology.
- (4) Tsimshian. Texts published by the Bureau of American Ethnology and the American Ethnological Society.
- (5) Kwakiutl. Texts published by the Jesup Expedition and in the Columbia University series.
- (6) Chinook. Texts published by the Bureau of American Ethnology.
- (7) Maidu. Texts published by the American Ethnological Society, but too late to be used.
- (8) Algonquian. Texts published by the American Ethnological Society.
- (9) Sioux. Texts in Contributions to North American Ethnology.
- (10) Eskimo. Texts in "Meddelelser om Grønland," but not used systematically.

Although Dr. Boas has urged the desirability of undertaking the publication of the series of vocabularies, no definite steps have yet been taken toward the

realization of this plan, owing largely to lack of funds for the employment of assistants in preparing the materials. It is hoped, however, that such a series of vocabularies, based on the published grammars and on the series of texts above referred to, may be prepared for publication in the near future. Much of the preliminary work has been done. There are, for example, extended manuscript dictionaries of the Haida, Tsimshian, Kwakiutl, Chinook, and Sioux, but none of them is yet ready for the printer.

The work on Part 2 of the Handbook of American Indian Languages is progressing satisfactorily. The sketch of the Takelma is in page form (pp. 1-296), but Dr. Boas has undertaken the correlation of this sketch with the Takelma Texts which meanwhile have been published by the University of Pennsylvania, and a considerable amount of work remains to be done to finish this revision. The Coos grammar is in galley. The Coos Texts are at the present writing being printed by the American Ethnological Society, and here also references are being inserted. Dr. Leo J. Frachtenberg has continued his collection of material for the handbook with commendable energy and intelligence. The field work has been financially aided by Columbia University, partly through a gift made by Mrs. Henry Villard and partly through funds provided by Mr. Homer E. Sargent. It has also been possible to utilize for the work on the Alsea the collections made at a former time by Prof. Livingston Farrand on an expedition supported by the late Mr. Henry Villard. On his last expedition Dr. Frachtenberg was able to determine that the Siuslaw is an independent stock, although morphologically affiliated with the Alsea, Coos, and Siuslaw group. He also collected extensive material on the Alsea and Molala.

The most important result, which is appearing more and more clearly from the investigations carried out under the direction of Dr. Boas, lies in the fact that it will be possible to classify American languages on a basis wider than that of linguistic stocks. In 1893 Dr. Boas called attention to the fact that a number of languages in northern British Columbia seem to have certain morphological traits in common, by which they are sharply differentiated from all the neighboring languages, although the evidence for a common origin of the stocks is unsatisfactory. Dr. Boas and his assistants have followed this observation, and it can now be shown that throughout the continent languages may be classed in wider morphological groups. It is interesting to note that phonetic groups may be distinguished in a similar manner, but these do not coincide with the morphological groups. These observations are in accord with the results of modern inquiries in Africa and Asia, where the influence of Hamitic phonetics on languages of the Sudan and the influence of Sumerian on early Babylonian have been traced in a similar manner. Analogous conditions seem to prevail also in South Africa, where the phonetics of the Bushman languages have influenced the neighboring Bantu languages. In this way a number of entirely new and fundamental problems in linguistic ethnography have been formulated, the solution of which is of the greatest importance for a clear understanding of the early history of the American Continent.

The Handbook of American Indian Languages as planned at the present time deals exclusively with an analytical study of the morphology of each linguistic family, without any attempt at a detailed discussion of phonetic processes, their influence upon the development of the language, and the relation of dialects. Dr. Boas recommends that the present Handbook of American Indian Languages be followed by a series of handbooks each devoted to a single linguistic stock, in which the development of each language, so far as it can be traced by comparative studies, should be treated.

The study of aboriginal American music was conducted among the Chippewa Indians by Miss Frances Densmore, who extended her field of work previously

begun among that people and elaborated the system of analyzing their songs. After spending several weeks on the Lac du Flambeau Reservation in Wisconsin she accompanied the Chippewa from that reservation to the Menominee Reservation in the same State, where the Lac du Flambeau Chippewa ceremonially presented two drums to the Menominee. This ceremony was closely observed, photographs being taken and the speeches of presentation translated, and the songs of the ceremony were recorded by Miss Densmore on a phonograph after the return of the drum party to Lac du Flambeau. Many of the songs are of Sioux origin, as the ceremony was adopted from that people; consequently the songs were analyzed separately from those of Chippewa origin. Numerous old war songs were recorded at Lac du Flambeau, also songs said to have been composed during dreams, and others used as accompaniments to games and dances. The analytical tables published during the year in Bulletin 45, Chippewa Music, have been combined by Miss Densmore with those of songs collected during the year 1910-11, making a total of 340 Chippewa songs under analysis. These are analyzed in 12 tables, showing the structure, tone material, melodic progression, and rhythm of the songs, the rhythm of the drum, the relation between the metric unit of the voice and drum, and other points bearing on the development and form of primitive musical expression. This material is now almost ready for publication. The Sioux songs of the drum presentation ceremony, similarly analyzed, constitute the beginning of an analytical study of the Sioux music, which will be continued and extended during the fiscal year 1911-12.

Miss Alice C. Fletcher and Mr. La Flesche conducted the final proof revision of their monograph on the Omaha tribe, to accompany the twenty-seventh annual report, which was in press at the close of the fiscal year. This memoir will comprise 658 printed pages and will form the most complete monograph of a single tribe that has yet appeared.

Mr. J. P. Dunn, whose studies of the Algonquian tribes of the Middle West have been mentioned in previous reports, deemed it advisable, before continuing his investigation of the languages of the tribes comprising the former Illinois confederacy, to await the completion of the copying of the anonymous manuscript Miami-French Dictionary, attributed to Père Joseph Ignatius Le Boulanger, in the John Carter Brown Library at Providence, Rhode Island. Through the courteous permission of Mr. George Parker Winship, librarian, the bureau has been enabled to commence the copying of this manuscript, the difficult task being assigned to Miss Margaret Bingham Stillwell, under Mr. Winship's immediate direction. At the close of the fiscal year 20½ pages of the original (comprising 95 pages of transcript), of the total of 155 pages of the dictionary proper, were finished and submitted to the bureau. It is hoped that on the completion of the copying the bureau will have a basis for the study of the Miami and related languages that would not be possible among the greatly modified remnant of the Indians still speaking them.

Prof. Howard M. Ballou, of Honolulu, has continued the preparation of the List of Works Relating to Hawaii, undertaken in collaboration with the late Dr. Cyrus Thomas, and during the year submitted the titles of many early publications, including those of obscure books printed in the Hawaiian language.

Mr. John P. Harrington, of the School of American Archaeology, proceeded in March to the Colorado Valley in Arizona and California for the purpose of continuing his studies, commenced a few years before, among the Mohave Indians, and incidentally to make collections for the United States National Museum. Mr. Harrington was still among these Indians at the close of July, and the results of his studies, which cover every phase of the life of this interesting people, are to be placed at the disposal of the bureau for publication.

PUBLICATIONS.

The general editorial work of the bureau continued in immediate charge of Mr. J. G. Gurley, editor. The editing of Part 2 of Bulletin 30, Handbook of American Indians, was conducted by Mr. Hodge, while the editorial supervision of Bulletin 40, Handbook of American Indian Languages, was in charge of Dr. Boas. At the close of the fiscal year the twenty-seventh annual report was nearly ready for the bindery; more than one-third of Bulletin 40, Part 2, was in type (mostly in pages); and Bulletin 47, a Dictionary of the Biloxi and Ofo Languages, by Dorsey and Swanton, was in page form. Some progress had been made in the revision of the galley proof of Bulletin 46, Byington's Choctaw Dictionary, a work requiring the expenditure of considerable time and labor. Much of Mr. Gurley's time during the year was given to the work of editing and proof reading the twenty-seventh annual report and its accompanying paper, the monograph on the Omaha tribe, by Miss Fletcher and Mr. La Flesche, above referred to. The following publications were issued during the year:

Bulletin 30. Handbook of American Indians North of Mexico (F. W. Hodge, editor), Part 2.

Bulletin 37. Antiquities of Central and Southeastern Missouri (Gerard Fowke).

Bulletin 40. Handbook of American Indian Languages (Franz Boas, editor), Part 1.

Bulletin 43. Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico (J. R. Swanton).

Bulletin 44. Indian Languages of Mexico and Central America and their Geographical Distribution (Cyrus Thomas and J. R. Swanton).

Bulletin 45. Chippewa Music (Frances Densmore).

Bulletin 50. Preliminary Report on a Visit to the Navaho National Monument, Arizona (J. Walter Fewkes).

Bulletin 51. Antiquities of the Mesa Verde National Park: Cliff Palace (J. Walter Fewkes).

The preparation of the illustrations for the publications of the bureau and the making of photographic portraits of the members of visiting deputations of Indians were in charge of Mr. De Lancey Gill, illustrator. Of the 246 negatives made, 120 comprise portraits of visiting Indians. In addition 372 photographic films, exposed by members of the bureau in connection with their field work, were developed and printed. Photographic prints for publication and exchange were made to the number of 1,469, and 22 drawings for use as illustrations were prepared. Mr. Gill was assisted, as in the past, by Mr. Henry Walther.

LIBRARY.

The library of the bureau has continued in the immediate charge of Miss Ella Leary, librarian. During the year that part of the southeastern gallery of the lower main hall of the Smithsonian Building which was vacated by the National Museum, was assigned to the use of the bureau library, and three additional stacks were built, providing shelf room for about 2,500 volumes. Nearly that number of books which had been stored, and consequently made inaccessible, were placed on the new shelves. The policy carried out from year to year of increasing the library by exchange with other institutions has been continued, and special effort made to complete the collection of serial publications. Especially to be noted is the completion of the sets of publications of the Maine Historical Society and the Archives of Pennsylvania, both rich in

material pertaining to the Indians. As in the past, it has been necessary for the bureau to make use of the Library of Congress from time to time, about 200 volumes having been borrowed during the year. Twelve hundred books and approximately 650 pamphlets were received, in addition to the current numbers of more than 600 periodicals. Of the books and pamphlets received, 148 were acquired by purchase, the remainder by gift or exchange. Six hundred and eighty-nine volumes were bound by the Government Printing Office, payment therefor being made from the allotment "for printing and binding * * * annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding," authorized by the sundry civil act. This provision has enabled the bureau, during the last two years, to bind many volumes almost in daily use which were threatened with destruction. The catalogue of the bureau now records 17,250 volumes; there are also about 12,200 pamphlets, and several thousand unbound periodicals. The library is constantly referred to by students not connected with the bureau, as well as by various officials of the Government service.

PROPERTY.

As noted in previous reports the principal property of the bureau consists of its library, manuscripts, and photographic negatives. In addition it possesses a number of cameras, phonographic machines, and ordinary apparatus and equipment for field work, stationery and office supplies, a moderate amount of office furniture, typewriters, etc., and the undistributed stock of its publications. The sum of \$304.62 was expended for office furniture (including bookstacks at a cost of \$205) during the fiscal year.

RECOMMENDATIONS.

For the purpose of extending the systematic researches of the bureau and of affording additional facilities for its administration, the following recommendations are made:

A question having arisen in the Committee on Appropriations of the House of Representatives as to the purpose for which an increase of \$2,000 in the bureau's appropriation in 1909 was intended, the work of excavating and repairing antiquities existing in national parks and monuments has been curtailed. The importance of elucidating the archeological problems connected with these ancient remains and of repairing the more important of them for visitors and for future students is so apparent that the need of continuing this work is generally recognized, consequently an estimate of \$4,000 "for the exploration and preservation of antiquities" has been submitted for the next fiscal year.

Ethnological research in Alaska is urgently needed by reason of the great changes taking place among the Indians and the Eskimo since the influx of white people a few years ago. Unless this investigation is undertaken at once the aboriginal inhabitants will have become so modified by contact with whites that knowledge of much of their primitive life will be lost. It is recommended that the sum of \$4,500 be appropriated for this work.

The more speedy extension of ethnological researches among the remnants of the Algonquian tribes formerly occupying the Middle West is desired. In a number of cases these tribes are represented by only a few survivors who retain any knowledge of the traits, language, and customs of their people, hence it will be impossible to gather much of this information unless the work is extended more rapidly, as the funds now at the bureau's disposal for this purpose are inadequate. The additional sum of \$1,000 is recommended for this purpose.

As previously stated, the demand for the Handbook of American Indians has been so great that many schools and libraries have necessarily been denied. The need of a revised edition is urgent, but the revision can not be satisfactorily undertaken and the latest information incorporated without the employment of special ethnologic assistants—those who have devoted special study to particular tribes—and editorial and clerical aid. It is recommended that the sum of \$3,800 be appropriated for this purpose.

The bureau is constantly in receipt of requests from schools, historical societies, compilers of textbooks, etc., for photographic prints of Indian subjects, since it is generally known that the bureau possesses many thousands of negatives accumulated in the course of its investigations. As no funds are now available for this purpose, it is recommended that a reasonable sum, say \$1,000, be appropriated for the purpose of furnishing prints for educational purposes. In most cases applicants would doubtless be willing to pay the cost, but at present the bureau has no authority for selling photographs.

The manuscripts accumulated by the bureau form a priceless collection; indeed many of them, if lost, could not be replaced, since they represent the results of studies of Indians who have become extinct or have lost their tribal identity. It is therefore urgently recommended that the sum of \$1,350 be appropriated for fireproofing a room and for providing metal cases for the permanent preservation of the manuscripts.

Respectfully submitted.

F. W. HODGE, *Ethnologist in Charge.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX III.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1911, which was prepared under the direction of Mr. C. W. Shoemaker, chief clerk, who was in charge of the service from January, 1910, until June 1, 1911.

The congressional appropriation for the support of the service during 1911 was \$32,200 (the same amount granted for the past three years), and the sum collected on account of repayments was \$4,754.99, making the total available resources for carrying on the system of international exchanges \$36,954.99.

The total number of packages handled during the year was 228,698—an increase over the number for the preceding year of 7,073. The weight of these packages was 560,808 pounds—a gain of 76,124 pounds. For purposes of comparison the number and weight of packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	103,760	.....	116,219	.....
Publications received in return for parliamentary documents.....		1,752		18,467
United States departmental documents sent abroad.....	55,104	.....	216,686	.....
Publications received in return for departmental documents.....		8,715		18,837
Publications from miscellaneous sources sent abroad.....	28,834	.....	56,165	.....
Publications received from abroad for miscellaneous distribution.....		30,524		134,434
Total.....	187,707	40,991	389,070	171,738
Grand total.....	228,698		560,808	

The disparity between the number of packages received and those sent may be accounted for, in part, by the fact that many returns for publications sent abroad are forwarded to their destinations by mail and not through the exchange service. This difference is further due to the fact that whereas packages sent are made up in most cases of separate publications, those received contain several volumes—in some instances the term “package” being applied to large boxes often containing 100 or more publications.

By referring to the above statement it will be noted that 74 per cent of the work of the office has been conducted in behalf of the United States governmental establishments.

Of the 2,380 boxes used in forwarding exchanges to foreign bureaus and agencies for distribution (an increase of 347 boxes over 1910), 885 boxes contained full sets of United States official documents for authorized depositories and 1,995 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents.

Several changes have been made during the year in the routine of the Exchange Office looking to the economical and efficient administration of the service. These changes are here briefly referred to.

It had been the practice for many years to keep a card record of both incoming and outgoing packages—a credit and debit account with each establishment or individual using the facilities of the Exchange Service—thus enabling the Institution to answer inquiries concerning the transmission of any particular package without delay. As the keeping of these cards involved a great deal of labor—quite out of proportion to the benefits derived therefrom—and also as most of the information given thereon could, with the expenditure of a little more time, be obtained from other records in the office, the detailed statement of outgoing packages has been discontinued. This curtailment in the work has made it possible to dispense with the services of one of the clerks in the record room. The discontinuance of these cards has, furthermore, brought about a change in the work in the shipping room whereby the preparation of consignments for transmission abroad is facilitated.

Since the fiscal year 1897 there has been printed in the report on the exchanges, under the caption "Interchange of Publications between the United States and Other Countries," a statement showing in detail the number of packages sent to and received from each country through the International Exchange Service. In most instances, the statistics contained in these statements indicated that a much larger number of packages were sent abroad than were received in return. While it is true that a certain disparity exists, the statements were misleading, since, as already explained, a great many packages are received through other channels by correspondents in this country in return for those sent through the Exchange Service. In view of this fact, and also because the statistics contained in these statements were seldom required for the use of the Exchange Office, the keeping of the detailed record from which they were derived has been discontinued. The time saved by this and other minor changes in the receiving room has enabled the clerical force in that room to keep the work required in handling and recording the large number of packages received for transmission through the service more nearly up to date.

Mention was made in the last report that the German authorities had in contemplation the founding of an institution at Berlin to further cultural relations between Germany and the United States, and that one of its functions would be the transmission and distribution of German exchanges. This establishment, which is known as the "Amerika-Institut," was organized in the fall of 1910, and the exchange of publications was taken up by it on January 1, 1911. On the latter date the exchange agency maintained by the Smithsonian Institution in Leipzig at the publishing house of Karl W. Hiersemann was discontinued.

Prior to the discontinuance of the Leipzig agency the interchange of publications between correspondents in Luxemburg and Roumania and those in the United States was conducted through that medium. In compliance with the Institution's request, the Amerika-Institut has been good enough to assume charge of the distribution of packages in Luxemburg. The Academia Romana at Bucharest—the depository of a partial set of United States governmental documents—has been approached with a view to enlisting its services in the interchange of publications between Roumania and the United States, and it is hoped that the academy may find it convenient to have this work conducted under its auspices.

The Japanese exchange agency and the depository of a full set of United States governmental documents was transferred by the Japanese Government, during the latter part of the year, from the Department of Foreign Affairs to

the Imperial Library at Tokyo. The regular series of official documents, as well as all publications for distribution in Japan, are therefore now forwarded to that library.

An application received by the Institution from the under secretary to the Government of the United Provinces of Agra and Oudh, Allahabad, India, for copies of such United States official publications as might be of interest to it was favorably acted upon by the Library of Congress, and that Government was added to the list of those countries receiving partial sets of governmental documents. The first shipment, consisting of six boxes, was forwarded to the under secretary on October 11, 1910.

Two cases forwarded from Washington in October, 1910, containing exchanges for miscellaneous addresses in New South Wales, were destroyed in transit to that country, the steamship by which the consignment was transmitted having been burned at sea. The senders of the packages contained in these cases were communicated with, and it is gratifying to state that it was possible for most of them to supply copies of the lost publications.

The work inaugurated in 1908 of actively seeking returns from foreign countries for the exchanges sent to them by this Government has resulted during the year in the acquisition of important collections of publications for the Library of Congress and for several other establishments of the Government.

About 10,000 foreign governmental documents of a statistical character, returned by the Library of Congress as duplicates, have been stored for some time in the Smithsonian Institution. These books were arranged and listed during the year under the direction of the assistant librarian, while the Exchange Service, through which the documents were received from abroad, provided the extra clerical assistance required. Upon completion of this work most of the documents were forwarded to the New York Public Library to complete its series of foreign governmental publications.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 55 full sets of United States official publications and 34 partial sets, the United Provinces of Agra and Oudh having been added during the year to the list of countries receiving partial sets.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
 Argentina: Biblioteca de la Universidad Nacional de La Plata.
 Australia: Library of the Commonwealth Parliament, Melbourne.
 Austria: K. K. Statistische Central-Commission, Vienna.
 Baden: Universitäts-Bibliothek, Freiburg.
 Bavaria: Königl. Hof- und Staats-Bibliothek, Munich.
 Belgium: Bibliothèque Royale, Brussels.
 Brazil: Bibliotheca Nacional, Rio de Janeiro.
 Canada: Parliamentary Library, Ottawa.
 Cape Colony: Government Stationery Department, Cape Town.
 Chile: Biblioteca del Congreso Nacional, Santiago.
 China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
 Colombia: Biblioteca Nacional, Bogota.
 Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.

- Cuba: Secretaría de Estado (Asuntos Generales y Canje Internacional), Habana.
- Denmark: Kongelige Bibliotheket, Copenhagen.
- England: British Museum, London.
- England: London School of Economics and Political Science, London.
- France: Bibliothèque Nationale, Paris.
- France: Préfecture de la Seine, Paris.
- Germany: Deutsche Reichstags-Bibliothek, Berlin.
- Greece: Bibliothèque Nationale, Athens.
- Haiti: Secrétairerie d'État des Relations Extérieures, Port au Prince.
- Hungary: Hungarian House of Delegates, Budapest.
- India: Department of Education (Books), Government of India, Calcutta.
- Ireland: National Library of Ireland, Dublin.
- Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
- Japan: Imperial Library of Japan, Tokyo.
- Manitoba: Provincial Library, Winnipeg.
- Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
- Netherlands: Library of the States General, The Hague.
- New South Wales: Board for International Exchanges, Sydney.
- New Zealand: General Assembly Library, Wellington.
- Norway: Storthingets Bibliothek, Christiania.
- Ontario: Legislative Library, Toronto.
- Peru: Biblioteca Nacional, Lima.
- Portugal: Bibliotheca Nacional, Lisbon.
- Prussia: Königliche Bibliothek, Berlin.
- Quebec: Legislative Library, Quebec.
- Queensland: Parliamentary Library, Brisbane.
- Russia: Imperial Public Library, St. Petersburg.
- Saxony: Königliche Oeffentliche Bibliothek, Dresden.
- Servia: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
- South Australia: Parliamentary Library, Adelaide.
- Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- Sweden: Kungliga Bibliotheket, Stockholm.
- Switzerland: Bibliothèque Fédérale, Berne.
- Tasmania: Parliamentary Library, Hobart.
- Transvaal: Government Library, Pretoria.
- Turkey: Department of Public Instruction, Constantinople.
- Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.
- Venezuela: Biblioteca Nacional, Caracas.
- Victoria: Public Library, Melbourne.
- Western Australia: Public Library of Western Australia, Perth.
- Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

- Alberta: Legislative Library, Edmonton.
- Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
- Bolivia: Ministerio de Colonización y Agricultura, La Paz.
- Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
- British Columbia: Legislative Library, Victoria.
- Bulgaria: Minister of Foreign Affairs, Sofia.
- Ceylon: United States Consul, Colombo.
- Ecuador: Biblioteca Nacional, Quito.

Egypt: Bibliothèque Khédiviale, Cairo.
Guatemala: Secretary of the Government, Guatemala.
Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
Honduras: Secretary of the Government, Tegucigalpa.
Jamaica: Colonial Secretary, Kingston.
Liberia: Department of State, Monrovia.
Lourenço Marques: Government Library, Lourenço Marques.
Malta: Lieutenant-Governor, Valetta.
Montenegro: Ministère des Affaires Étrangères, Cetinje.
Natal: Colonial Secretary's Office, Pietermaritzburg.
New Brunswick: Legislative Library, St. John.
Newfoundland: Colonial Secretary, St. John's.
Nicaragua: Superintendente de Archivos Nacionales, Managua.
Northwest Territories: Government Library, Regina.
Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
Orange River Colony: Government Library, Bloemfontein.
Panama: Secretaría de Relaciones Exteriores, Panama.
Paraguay: Oficina General de Informaciones y Canjes y Comisaría General de Inmigración, Asunción.
Prince Edward Island: Legislative Library, Charlottetown.
Roumania: Academia Romana, Bucarest.
Salvador: Ministerio de Relaciones Exteriores, San Salvador.
Siam: Department of Foreign Affairs, Bangkok.
Straits Settlements: Colonial Secretary, Singapore.
United Provinces of Agra and Oudh: under Secretary to Government, Allahabad.
Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF THE OFFICIAL JOURNAL,

As mentioned in previous reports, a resolution of the Congress was approved March 4, 1909, setting aside such number as might be required, not exceeding 100 copies, of the daily issue of the Congressional Record for exchange, through the agency of the Smithsonian Institution, with the legislative chambers of such foreign governments as might agree to send to the United States in return current copies of their parliamentary record or like publication. The purpose of this resolution was to enable the Institution, on the part of the United States, to more fully carry into effect the provisions of the convention concluded at Brussels in 1886, providing for the immediate exchange of the official journal.

The Governments of the Argentine Republic, Denmark, and Great Britain have entered into this exchange during the year. A complete list of the countries to which the Congressional Record is now sent is given below:

Argentine Republic.	France.	Prussia.
Australia.	Great Britain.	Roumania.
Austria.	Greece.	Russia.
Baden.	Guatemala.	Servia.
Belgium.	Honduras.	Spain.
Brazil.	Hungary.	Switzerland.
Canada.	Italy.	Transvaal.
Cape of Good Hope.	New South Wales.	Uruguay.
Cuba.	New Zealand.	Western Australia.
Denmark.	Portugal.	

There are at present 29 countries with which the immediate exchange of the official journal is carried on. To some of these countries two copies of the Congressional Record are sent—one to the upper and one to the lower house of parliament—the total number transmitted being 84.

It may be repeated in this connection that the exchange here alluded to is separate and distinct from the exchange of official documents which has existed between the United States and other countries for many years. It is interparliamentary, and provides for the immediate transmission, direct by mail, of the official journal as soon as published.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of bureaus or agencies through which the distribution of exchanges is effected. Those in the larger and many in the smaller countries forward to the Smithsonian Institution, in return, contributions for distribution in the United States:

Algeria, via France.

Angola, via Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Reconquista 588, Buenos Aires.

Austria: K. K. Statistische Central-Commission, Vienna.

Azores, via Portugal.

Barbados: Imperial Department of Agriculture, Bridgetown.

Belgium: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

Bolivia: Oficina Nacional de Estadística, La Paz.

Brazil: Serviço de Permutações Internacionais, Biblioteca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.¹

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

Canary Islands, via Spain.

Cape Colony: Government Stationery Department, Cape Town.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: Zi-ka-wei Observatory, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

Costa Rica: Oficina de Depósito y Canje de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Director-General, Survey Department, Giza (Mudiria).

France: Service Français des Echanges Internationaux, 110 Rue de Grenelle, Paris.

Germany: Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothéque Nationale, Athens.

Greenland, via Denmark.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

- Guadeloupe, via France.
- Guatemala: Instituto Nacional de Varones, Guatemala.
- Guinea, via Portugal.
- Haiti: Secrétaire d'Etat des Relations Extérieures, Port au Prince.
- Honduras: Biblioteca Nacional, Tegucigalpa.
- Hungary: Dr. Julius Pékler, Municipal Office of Statistics, City Hall, Budapest.
- Iceland, via Denmark.
- India: India Store Department, India Office, London.
- Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.
- Jamaica: Institute of Jamaica, Kingston.
- Japan: Imperial Library of Japan, Tokyo.
- Java, via Netherlands.
- Korea: His Imperial Japanese Majesty's Residency-General, Seoul.
- Liberia: Department of State, Monrovia.
- Lourenço Marquez: Government Library, Lourenço Marquez.
- Luxemburg, via Germany.
- Madagascar, via France.
- Madeira, via Portugal.
- Montenegro: Ministère des Affaires Étrangères, Cetinje.
- Mozambique, via Portugal.
- Natal: Agent-General for Natal, London.
- Netherlands: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.
- New Guinea, via Netherlands.
- New South Wales: Board for International Exchanges, Public Library, Sydney.
- New Zealand: Dominion Museum, Wellington.
- Nicaragua: Ministerio de Relaciones Exteriores, Managua.
- Norway: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
- Panama: Secretaria de Relaciones Exteriores, Panama.
- Paraguay: Ministerio de Relaciones Exteriores, Asuncion.
- Persia: Board of Foreign Missions of the Presbyterian Church, New York City.
- Peru: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
- Portugal: Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
- Queensland: Board of Exchanges of International Publications, Parliament House, Brisbane.
- Russia: Commission Russe des Echanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
- Salvador: Ministerio de Relaciones Exteriores, San Salvador.
- Servia: Section Administrative du Ministère des Affaires Etrangères, Belgrade.
- Siam: Department of Foreign Affairs, Bangkok.
- South Australia: Public Library of South Australia, Adelaide.
- Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- Sumatra, via Netherlands.
- Sweden: Kongliga Svenska Vetenskaps Akademien, Stockholm.
- Switzerland: Service des Echanges Internationaux, Bibliothèque Fédérale Centrale, Bern.
- Syria: Board of Foreign Missions of the Presbyterian Church, New York.
- Tasmania: Royal Society of Tasmania, Hobart.
- Transvaal: Government Library, Pretoria.

Trinidad: Victoria Institute, Port of Spain.

Tunis, via France.

Turkey: American Board of Commissioners for Foreign Missions, Boston.

Uruguay: Oficina de Canje Internacional, Montevideo.

Venezuela: Biblioteca Nacional, Caracas.

Victoria: Public Library of Victoria, Melbourne.

Western Australia: Public Library of Western Australia, Perth.

I may add here, as a matter of record, that I was appointed assistant secretary in charge of Library and Exchanges on June 1, 1911.

Respectfully submitted.

F. W. TRUE,

Assistant Secretary in Charge of Library and Exchanges.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX IV.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to present herewith a report of the operations of the National Zoological Park for the fiscal year ending June 30, 1911.

The general appropriation made by Congress for that year was \$100,000, and in addition to this an appropriation of \$15,000 was made for roads and walks.

The cost of maintenance was \$81,325, and the amount remaining from the general appropriation, \$18,675, was expended in various improvements and repairs.

ACCESSIONS.

Among the important accessions of the year were a pair of Haytian solenodons, a rare insectivorous mammal, presented by Mr. and Mrs. Franklin Adams of the Pan American Union. A pair of northern fur seals was received from the United States Bureau of Fisheries, a fine female grizzly bear from Maj. H. C. Benson, acting superintendent of the Yellowstone National Park, and four Virginia deer from Gen. Joseph S. Smith, manager of the National Soldiers Home, Bangor, Maine. By purchase, the park obtained a hippopotamus, an East African buffalo, three prong-horn antelopes, a pair of reindeer, a large Asiatic macaque monkey, and various other animals. Some important animals were also obtained by exchange, as noted below. The accessions included about twenty species not before represented in the collection.

Early in its history the park exhibited for two years a hippopotamus which had been received as a loan. Since that was withdrawn the species has not been represented in the collection. The present animal, a female about 2 years old, is from East Africa and weighs 850 pounds. The buffalo was captured in German East Africa and is believed to be the form described as *Buffelus neumanni*. The African buffalo has for some time been rather difficult to obtain, and the park was fortunate in being able to secure a specimen at comparatively small cost. It was also fortunate in obtaining in western Texas a male and two female prong-horn antelopes, all adult, from which two vigorous young have been born. Through an animal dealer on the Pacific coast the large brown macaque monkey of southeastern Asia and several other species new to the collection were obtained which had not been procurable elsewhere.

EXCHANGES.

Surplus animals were disposed of by exchange as usual, in accordance with the terms of the act establishing the park. They were sent to the New York Zoological Park, the London Zoological Garden, and various dealers and private individuals. In return for these, the park secured a number of important animals, including a fine specimen each of bontebok, bleesbok, and springbok, a small anteater, a pair of tenrecs (insectivorous mammals of Madagascar), and other mammals and birds. The bontebok and bleesbok, which are very beautiful African antelopes, are especially valued, as the former now exists only in a few

semiwild herds in Cape Colony, 300 individuals, perhaps, remaining from the "thousands upon thousands" described by early hunters in South Africa, while the latter has been greatly reduced in numbers.

Whenever possible, direct exchange was made, but where the person who desired to obtain an animal from the park had nothing acceptable to offer, the exchange was effected through some one of the responsible dealers in animals.

Black-crowned night herons had bred so freely in the flying cage that it became a necessity to materially reduce their number and some were sent (as gifts) to the New York Zoological Park, London Zoological Garden, and the park departments of St. Louis and Rochester.

Animals in the collection June 30, 1911.

MAMMALS.

Grivet monkey (<i>Cercopithecus sabaeus</i>)	1	American badger (<i>Taxidea americana</i>)	4
Green monkey (<i>Cercopithecus callitrichus</i>)	1	Common skunk (<i>Mephitis mephitis</i>)	2
Mona monkey (<i>Cercopithecus mona</i>)	2	Wolverine (<i>Gulo luscus</i>)	1
Diana monkey (<i>Cercopithecus diana</i>)	1	American marten (<i>Mustela americana</i>)	2
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	2	Fisher (<i>Mustela pennanti</i>)	1
White-collared mangabey (<i>Cercocebus collaris</i>)	1	Common ferret (<i>Putorius putorius</i>)	1
Bonnet monkey (<i>Macacus sinicus</i>)	1	Black-footed ferret (<i>Putorius nigripes</i>)	3
Macaque monkey (<i>Macacus cynomolgus</i>)	5	North American otter (<i>Lutra canadensis</i>)	5
Platy-tailed monkey (<i>Macacus nemestrinus</i>)	3	Eskimo dog (<i>Canis familiaris</i>)	2
Rhesus monkey (<i>Macacus rhesus</i>)	15	Dingo (<i>Canis dingo</i>)	4
Brown macaque (<i>Macacus arctoides</i>)	4	Gray wolf (<i>Canis occidentalis</i>)	6
Japanese monkey (<i>Macacus fuscatus</i>)	4	Black wolf (<i>Canis occidentalis</i>)	1
Formosan rock-macaque (<i>Macacus cyclops</i>)	1	Coyote (<i>Canis latrans</i>)	4
Black ape (<i>Cynopithecus niger</i>)	1	Woodhouse's coyote (<i>Canis frustror</i>)	5
Anubis baboon (<i>Papio anubis</i>)	1	Crab-eating dog (<i>Canis cancrivorus</i>)	1
East African baboon (<i>Papio cynocephalus</i>)	1	Red fox (<i>Vulpes pennsylvanicus</i>)	4
Chacma (<i>Papio porcarius</i>)	1	Swift fox (<i>Vulpes velox</i>)	2
Mandrill (<i>Papio maimon</i>)	1	Arctic fox (<i>Vulpes lagopus</i>)	2
Drill (<i>Papio leucophaeus</i>)	4	Gray fox (<i>Urocyon cinereo-argenteus</i>)	6
Gray spider monkey (<i>Ateles geoffroyi</i>)	1	Striped hyena (<i>Hyæna striata</i>)	1
White-throated capuchin monkey (<i>Cebus hyppoleucus</i>)	3	African palm civet (<i>Viverra civetta</i>)	1
Brown monkey (<i>Cebus fatuellus</i>)	3	Common genet (<i>Genetta genetta</i>)	2
Weeper monkey (<i>Cebus capucinus</i>)	1	Sudan lion (<i>Felis leo</i>)	3
Ruffed lemur (<i>Lemur varius</i>)	1	Killimanjaro lion (<i>Felis leo sabakiensis</i>)	5
Ring-tailed lemur (<i>Lemur catta</i>)	2	Tiger (<i>Felis tigris</i>)	2
Tenrec (<i>Centetes caudatus</i>)	2	Cougar (<i>Felis oregonensis hippolestes</i>)	2
Polar bear (<i>Thalarctos maritimus</i>)	3	Jaguar (<i>Felis onca</i>)	1
European brown bear (<i>Ursus arctos</i>)	3	Mexican jaguar (<i>Felis onca goldmani</i>)	1
Kadiak bear (<i>Ursus middendorffi</i>)	1	Leopard (<i>Felis pardus</i>)	2
Yakutat bear (<i>Ursus dalli</i>)	1	Black leopard (<i>Felis pardus</i>)	1
Alaskan brown bear (<i>Ursus gyas</i>)	5	Serval (<i>Felis serval</i>)	1
Kidder's bear (<i>Ursus kidderi</i>)	1	Ocelot (<i>Felis pardalis</i>)	1
Himalayan bear (<i>Ursus thibetanus</i>)	1	Canada lynx (<i>Lynx canadensis</i>)	1
Grizzly bear (<i>Ursus horribilis</i>)	4	Bay lynx (<i>Lynx rufus</i>)	4
Black bear (<i>Ursus americanus</i>)	9	Spotted lynx (<i>Lynx rufus texensis</i>)	1
Cinnamon bear (<i>Ursus americanus</i>)	3	Florida lynx (<i>Lynx rufus floridanus</i>)	1
Sloth bear (<i>Melursus ursinus</i>)	1	Steller's sea lion (<i>Eumetopias stelleri</i>)	1
Kinkajou (<i>Cercoleptes caudivolvulus</i>)	1	California sea lion (<i>Zalophus californianus</i>)	2
Cacomistle (<i>Bassariscus astuta</i>)	1	Harbor seal (<i>Phoca vitulina</i>)	3
Gray coati mundi (<i>Nasua narica</i>)	3	Fox squirrel (<i>Sciurus niger</i>)	10
Raccoon (<i>Procyon lotor</i>)	17	Western fox squirrel (<i>Sciurus ludovicianus</i>)	3
		Gray squirrel (<i>Sciurus carolinensis</i>)	40
		Black squirrel (<i>Sciurus carolinensis</i>)	20
		Prairie dog (<i>Cynomys ludovicianus</i>)	71
		Alpine marmot (<i>Arctomys marmotta</i>)	3

Woodchuck (<i>Arotomys monax</i>)-----	3	Reindeer (<i>Rangifer tarandus</i>)-----	2
American beaver (<i>Oastor canadensis</i>)--	3	Virginia deer (<i>Odocoileus virginianus</i>)--	5
Coypu (<i>Myocastor oypus</i>)-----	4	Mule deer (<i>Odocoileus hemionus</i>)-----	2
Hutia-conga (<i>Capromys pilorides</i>)-----	2	Columbian black-tailed deer (<i>Odocoileus columbianus</i>)-----	1
Indian porcupine (<i>Hystrie leucura</i>)-----	1	Cuban deer (<i>Odocoileus sp.</i>)-----	1
Mexican agouti (<i>Dasyprocta mexicana</i>)--	2	Prong-horn antelope (<i>Antilocapra americana</i>)-----	5
Azara's agouti (<i>Dasyprocta azaræ</i>)-----	2	Coke's hartebeest (<i>Budalis cokei</i>)-----	2
Golden agouti (<i>Dasyprocta aguti</i>)-----	1	Bontebok (<i>Damallacus pygargus</i>)-----	1
Hairy-rumped agouti (<i>Dasyprocta prymnolopha</i>)-----	5	Blessbok (<i>Damallacus albifrons</i>)-----	1
Paca (<i>Catogenys paca</i>)-----	1	White-tailed gnu (<i>Connochates gnu</i>)-----	1
Guinea pig (<i>Cavia outleri</i>)-----	13	Defassa water buck (<i>Cobus defassa</i>)-----	1
Patagonian cavy (<i>Dolichotis patagonica</i>)-----	2	Indian antelope (<i>Antilope cervicapra</i>)--	3
Domestic rabbit (<i>Lepus cuniculus</i>)-----	41	Springbuck (<i>Antidorcas euchore</i>)-----	1
Cape hyrax (<i>Procavia capensis</i>)-----	2	Grant's gazelle (<i>Gazella granti</i>)-----	1
Indian elephant (<i>Elephas maximus</i>)-----	1	Nilgai (<i>Boselaphus tragocamelus</i>)-----	2
Brazilian tapir (<i>Tapirus americanus</i>)--	2	Congo harnessed antelope (<i>Tragelaphus gratus</i>)-----	3
Grevy's zebra (<i>Equus grevyi</i>)-----	1	East African eland (<i>Oreos canna patersonianus</i>)-----	1
Zebra-donkey hybrid (<i>Equus grevyi-asinus</i>)-----	1	Chamois (<i>Rupicapra tragus</i>)-----	3
Grant's zebra (<i>Equus burchelli granti</i>)--	1	Tahr (<i>Hemitragus jemlatus</i>)-----	6
Collared peccary (<i>Dicotyles angulatus</i>)--	8	Common goat (<i>Capra hircus</i>)-----	4
Wild boar (<i>Sus scrofa</i>)-----	1	Angora goat (<i>Capra hircus</i>)-----	4
Northern wart hog (<i>Phacochærus africanus</i>)-----	2	Barbary sheep (<i>Ovis tragelaphus</i>)-----	13
Hippopotamus (<i>Hippopotamus amphibius</i>)-----	1	Barbados sheep (<i>Ovis aries-tragelaphus</i>)-----	1
Guanaco (<i>Lama huanachus</i>)-----	3	Anoa (<i>Anoa depressicornis</i>)-----	1
Llama (<i>Lama glama</i>)-----	6	East African buffalo (<i>Buffelus neumanni</i>)-----	1
Alpaca (<i>Lama pacos</i>)-----	2	Zebu (<i>Bidos indicus</i>)-----	3
Vicugna (<i>Lama vicugna</i>)-----	2	Yak (<i>Poephagus grunniens</i>)-----	6
Bactrian camel (<i>Camelus bactrianus</i>)--	3	American bison (<i>Bison americanus</i>)-----	12
Muntjac (<i>Cervulus muntjac</i>)-----	1	Hairy armadillo (<i>Dasyppus villosus</i>)-----	2
Sambar deer (<i>Cervus aristotels</i>)-----	1	Wallaroo (<i>Macropus robustus</i>)-----	4
Philippine deer (<i>Cervus philippinus</i>)--	1	Red-necked wallaby (<i>Macropus ruficollis</i>)-----	1
Hog deer (<i>Cervus porcinus</i>)-----	4	Brush-tailed rock kangaroo (<i>Petrogale penicillata</i>)-----	2
Barasingha deer (<i>Cervus durauellii</i>)--	10	Virginia opossum (<i>Didelphys marsupialis</i>)-----	2
Axis deer (<i>Cervus axis</i>)-----	5		
Japanese deer (<i>Cervus sika</i>)-----	0		
Red deer (<i>Cervus claphus</i>)-----	13		
American elk (<i>Cervus canadensis</i>)-----	9		
Fallow deer (<i>Cervus dama</i>)-----	8		

BIRDS.

European blackbird (<i>Merula merula</i>)-----	1	Whydah weaver (<i>Vidua paradisica</i>)-----	4
Catbird (<i>Dumetella carolinensis</i>)-----	1	Painted bunting (<i>Passerina ciris</i>)-----	2
Brown thrasher (<i>Toxostoma rufum</i>)-----	1	Red-crested cardinal (<i>Paroaria cucullata</i>)-----	10
Japanese robin (<i>Liothrix luteus</i>)-----	2	Common cardinal (<i>Cardinalis cardinalis</i>)-----	1
Laughing thrush (<i>Garrulax leucolophus</i>)-----	2	Rose-breasted grosbeak (<i>Zamelodia ludoviciana</i>)-----	1
Orange-checked waxbill (<i>Estrelda melopoda</i>)-----	8	Siskin (<i>Spinus spinus</i>)-----	2
Cordon-bleu (<i>Estrelda phœnicotis</i>)-----	8	European goldfinch (<i>Carduelis elegans</i>)-----	1
Cut-throat finch (<i>Amadina fasciata</i>)-----	4	Yellow hammer (<i>Emberiza citrinella</i>)--	2
Zebra finch (<i>Amadina castanotis</i>)-----	2	Common canary (<i>Serinus canarius</i>)-----	12
Black-headed finch (<i>Munia atricapilla</i>)-----	2	Bullfinch (<i>Pyrrhula europæa</i>)-----	13
White-headed finch (<i>Munia maja</i>)-----	5	Cowbird (<i>Molothrus ater</i>)-----	1
Nutmeg finch (<i>Munia punctularia</i>)-----	4	Purple grackle (<i>Quiscalus quiscula</i>)-----	1
Java sparrow (<i>Munia oryzivora</i>)-----	10	Red-winged blackbird (<i>Agelaius phœniceus</i>)-----	2
White Java sparrow (<i>Munia oryzivora</i>)-----	6	Common mynah (<i>Acridotheres tristis</i>)--	1
Parson finch (<i>Poephila cinota</i>)-----	1	European raven (<i>Corvus corax</i>)-----	1
Bearded finch (<i>Spermophila sp.</i>)-----	2	American raven (<i>Corvus corax sinuatus</i>)-----	1
Madagascar weaver (<i>Poudia madagascariensis</i>)-----	4	Blue jay (<i>Cyanocitta cristata</i>)-----	2
Red-billed weaver (<i>Quelea quelea</i>)-----	8		

European magpie (<i>Pica pica</i>)-----	1	Red-shouldered hawk (<i>Buteo lineatus</i>)--	1
American magpie (<i>Pica pica hudsonica</i>)-----	2	Sharp-shinned hawk (<i>Accipiter velox</i>)--	1
Piping crow (<i>Gymnokitta tibicen</i>)-----	2	Venezuelan hawk-----	1
Giant kingfisher (<i>Dacelo gigas</i>)-----	1	Caracara (<i>Polyborus cheriway</i>)-----	3
Sulphur-crested cockatoo (<i>Cacatua galerita</i>)-----	3	Lammergeyer (<i>Gypaetus barbatus</i>)-----	1
White cockatoo (<i>Cacatua alba</i>)-----	6	South American condor (<i>Sarcorhamphus gryphus</i>)-----	2
Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)-----	1	California condor (<i>Gymnogyps californianus</i>)-----	3
Bare-eyed cockatoo (<i>Cacatua gymnotops</i>)-----	2	Griffon vulture (<i>Gyps fulvus</i>)-----	2
Roseate cockatoo (<i>Cacatua roseicapilla</i>)-----	3	Egyptian vulture (<i>Neophron percnopterus</i>)-----	1
Gang-gang cockatoo (<i>Callocephalon falcatum</i>)-----	1	Pileated vulture (<i>Neophron pileatus</i>)--	1
Yellow and blue macaw (<i>Ara ararauna</i>)-----	2	Turkey vulture (<i>Cathartes aura</i>)-----	5
Red and yellow and blue macaw (<i>Ara macao</i>)-----	3	Black vulture (<i>Cathartus aura</i>)-----	1
Red and blue macaw (<i>Ara chloroptera</i>)-----	1	King vulture (<i>Gypagus papa</i>)-----	1
Great green macaw (<i>Ara militaris</i>)--	1	Ring dove (<i>Columba palumbus</i>)-----	17
Kea (<i>Nestor notabilis</i>)-----	1	Red-billed pigeon (<i>Columba flaviventris</i>)-----	4
Mexican conure (<i>Conurus holochlorus</i>)	1	Mourning dove (<i>Zenaidura macroura</i>)--	9
Carolina parakeet (<i>Conuropsis carolinensis</i>)-----	2	Peaceful dove (<i>Geopelia tranquilla</i>)--	2
Tovl parakeet (<i>Brotogeris jugularis</i>)--	1	Cape dove (<i>Cena capensis</i>)-----	2
Cuban parrot (<i>Amazilia leucoccephala</i>)--	2	Crested pigeon (<i>Ocyphaps lophotes</i>)--	1
Orange-winged amazon (<i>Amazilia amazilia</i>)-----	1	Chachalaca (<i>Ortalis vetula</i>)-----	3
Porto Rican amazon (<i>Amazona vittata</i>)-----	1	Purplish guan (<i>Penelope purpurascens</i>)-----	1
Yellow-shouldered amazon (<i>Amazona ochroptera</i>)-----	1	Mexican curassow (<i>Crax globicera</i>)-----	2
Yellow-fronted amazon (<i>Amazona ochrocephala</i>)-----	2	Chapman's curassow (<i>Crax chapmani</i>)--	1
Yellow-headed amazon (<i>Amazona levillanti</i>)-----	2	Daubenton's curassow (<i>Crax daubentoni</i>)-----	1
Lesser vasa parrot (<i>Coracopsis nigra</i>)--	1	Wild turkey (<i>Meleagris gallopavo silvestris</i>)-----	18
Pigeon parakeet (<i>Palæornis columboides</i>)-----	1	Peafowl (<i>Pavo cristata</i>)-----	37
Love bird (<i>Agapornis pullaria</i>)-----	2	Jungle fowl (<i>Gallus bankiva</i>)-----	1
Green parakeet (<i>Loriculus</i> sp.)-----	2	Reeves's pheasant (<i>Phasianus reevesi</i>)--	1
Pennant's parakeet (<i>Platycercus elegans</i>)-----	2	Golden pheasant (<i>Thaumalea picta</i>)-----	1
Pale-headed parakeet (<i>Platycercus palliceps</i>)-----	1	Silver pheasant (<i>Euplocamus nycthemerus</i>)-----	2
Shell parakeet (<i>Melopsittacus undulatus</i>)-----	1	Black cock (<i>Lyrurus tetrix</i>)-----	1
Great horned owl (<i>Bubo virginianus</i>)--	13	European quail (<i>Coturnix communis</i>)--	1
Arctic horned owl (<i>Bubo virginianus subarcticus</i>)-----	2	Hungarian partridge (<i>Perdix perdix</i>)--	3
Screech owl (<i>Otus asio</i>)-----	2	Bobwhite (<i>Colinus virginianus</i>)-----	1
Barred owl (<i>Strix varia</i>)-----	2	Mountain quail (<i>Oreortyx picta</i>)-----	4
Barn owl (<i>Aluco pratincola</i>)-----	1	Scaled quail (<i>Callipepla squamata</i>)--	2
Sparrow hawk (<i>Falco sparverius</i>)-----	1	California quail (<i>Lophortyx californica</i>)-----	1
Bald eagle (<i>Haliaeetus leucocephalus</i>)--	13	Massena quail (<i>Cyrtonyx montezumae</i>)--	10
Alaskan bald eagle (<i>Haliaeetus leucocephalus alascanus</i>)-----	1	Purple gallinule (<i>Porphyrio carulea</i>)--	1
Short-tailed eagle (<i>Terathopus coaudatus</i>)-----	1	Black-backed gallinule (<i>Porphyrio melanotus</i>)-----	2
Harpy eagle (<i>Thrasaetus harpyia</i>)-----	1	American coot (<i>Fulica americana</i>)-----	11
Crowned hawk eagle (<i>Spizaetus coronatus</i>)-----	1	Flightless rail (<i>Oedromus australianus</i>)--	2
East African hawk (<i>Buteo</i> sp.)-----	1	Common caracara (<i>Caracara cristata</i>)--	1
Red-tailed hawk (<i>Buteo borealis</i>)-----	2	Demoiselle crane (<i>Anthropoides virgo</i>)--	5
		Crowned crane (<i>Balearica pavonina</i>)--	2
		Sandhill crane (<i>Grus mexicana</i>)-----	2
		Australian crane (<i>Grus australasiana</i>)-----	1
		Indian white crane (<i>Grus leucogeranus</i>)-----	2
		Thick-knee (<i>Eidionemus grallarius</i>)--	1
		Ruff (<i>Machetes pugnae</i>)-----	4
		Black-crowned night heron (<i>Nycticorax nycticorax naevius</i>)-----	81
		Little blue heron (<i>Florida carulea</i>)--	1
		Louisiana heron (<i>Hydranassa tricolor ruficollis</i>)-----	1

Reddish egret (<i>Dichromanassa rufescens</i>)	3	American white-fronted goose (<i>Anser albifrons gambeli</i>)	6
Snowy egret (<i>Egretta candidissima</i>)	4	Chinese goose (<i>Anser cygnoides</i>)	3
Great white heron (<i>Herodias egretta</i>)	1	Red-headed duck (<i>Marila americana</i>)	2
Great blue heron (<i>Ardea herodias</i>)	4	Wood duck (<i>Ais sponsa</i>)	12
Boat-bill (<i>Cancroma cochlearia</i>)	2	Mandarin duck (<i>Dendronessa galericulata</i>)	8
Black stork (<i>Olcenia nigra</i>)	1	Pintall (<i>Dasia acuta</i>)	6
White stork (<i>Olcenia olcena</i>)	2	Shoveler duck (<i>Spatula clypeata</i>)	3
Marabou stork (<i>Leptoptilus dubius</i>)	1	Blue-winged teal (<i>Querquedula discors</i>)	1
Wood ibis (<i>Mycteria americana</i>)	2	Green-winged teal (<i>Nettion carolinense</i>)	1
Sacred ibis (<i>Ibis aethiopica</i>)	4	Black duck (<i>Anas rubripes</i>)	2
White ibis (<i>Guara alba</i>)	21	Mallard (<i>Anas platyrhynchos</i>)	13
Roseate spoonbill (<i>Ajaja ajaja</i>)	3	American white pelican (<i>Pelecanus erythrorhynchos</i>)	4
European flamingo (<i>Phaenicopterus aethiopicus</i>)	6	European white pelican (<i>Pelecanus onocrotalus</i>)	2
Trumpeter swan (<i>Olor buccinator</i>)	2	Roseate pelican (<i>Pelecanus roseus</i>)	1
Whistling swan (<i>Olor columbianus</i>)	2	Brown pelican (<i>Pelecanus occidentalis</i>)	4
Mute swan (<i>Ogynus gibbus</i>)	2	Black-backed gull (<i>Larus marinus</i>)	1
Muscovy duck (<i>Cairina moschata</i>)	2	Herring gull (<i>Larus argentatus</i>)	1
White muscovy duck (<i>Cairina moschata</i>)	3	American herring gull (<i>Larus argentatus smithsonianus</i>)	6
Wandering tree-duck (<i>Dendrocygna arcuata</i>)	7	Laughing gull (<i>Larus atricollis</i>)	3
Fulvous tree-duck (<i>Dendrocygna bicolor</i>)	2	Gannet (<i>Sula bassana</i>)	1
Australian wood-duck (<i>Chenonetta jubata</i>)	1	Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)	8
Egyptian goose (<i>Oenailopus aegyptiacus</i>)	1	Mexican cormorant (<i>Phalacrocorax uruguayensis</i>)	1
Brant (<i>Branta bernicla glaucogastra</i>)	1	Water turkey (<i>Anhinga anhinga</i>)	6
Canada goose (<i>Branta canadensis</i>)	8	Somali ostrich (<i>Struthio molybdophanes</i>)	1
Hutchins's goose (<i>Branta canadensis hutchinsii</i>)	4	Common cassowary (<i>Casuarus galeatus</i>)	1
Lesser snow goose (<i>Chen hyperboreus</i>)	2	Common rhea (<i>Rhea americana</i>)	3
Greater snow goose (<i>Chen hyperboreus nivalis</i>)	1	Emu (<i>Dromaeus novae hollandiae</i>)	1

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)	16	Spreading adder (<i>Heterodon platyrhynchos</i>)	2
Painted turtle (<i>Chrysemys picta</i>)	4	Green snake (<i>Cyclophis aestivus</i>)	1
Diamond-back terrapin (<i>Malacoclemmys palustris</i>)	1	Black snake (<i>Zamenis constrictor</i>)	3
Three-toed box-tortoise (<i>Cistudo triangularis</i>)	6	Coach-whip snake (<i>Zamenis flagellum</i>)	2
Painted box-tortoise (<i>Cistudo ornata</i>)	5	Corn snake (<i>Coluber guttatus</i>)	1
Gopher turtle (<i>Xerobates polyphemus</i>)	1	Common chicken snake (<i>Coluber quadricittatus</i>)	2
Duncan Island tortoise (<i>Testudo ephippium</i>)	2	Gopher snake (<i>Composoma coralae cooperi</i>)	1
Albemarle Island tortoise (<i>Testudoolina</i>)	2	Pine snake (<i>Pityophis melanoleucus</i>)	11
Comb lizard (<i>Otenosaura</i> sp.)	1	Bull snake (<i>Pityophis sayi</i>)	2
Alligator lizard (<i>Sceloporus undulatus</i>)	2	Texas chicken snake (<i>Ophibolus calligaster</i>)	2
Horned lizard (<i>Phrynosoma cornutum</i>)	1	King snake (<i>Ophibolus getulus</i>)	2
Gila monster (<i>Heloderma suspectum</i>)	4	Texas garter snake (<i>Eutania proxima</i>)	1
Green lizard (<i>Lacerta viridis</i>)	1	Water moccasin (<i>Ancistrodon piscivorus</i>)	1
Anaconda (<i>Eunectes murinus</i>)	2	Copperhead (<i>Ancistrodon contortrix</i>)	3
Common boa (<i>Boa constrictor</i>)	1	Diamond rattlesnake (<i>Crotalus adamanteus</i>)	4
Antillean boa (<i>Boa d'atinoqua</i>)	1	Banded rattlesnake (<i>Crotalus horridus</i>)	2
Cuban tree-boa (<i>Epicrates angulifer</i>)	3		

GIFTS.

Mr. and Mrs. Franklin Adams, Pan American Union, two Haitian solenodons,
Miss M. Alexander, Moorefield, W. Va., a brown Capuchin monkey.

Dr. Paul Bartsch, Washington, D. C., two common crows.
 Frederick Carl, jr., Washington, D. C., two screech owls.
 Miss Catharine Carroll, Washington, D. C., a barn owl.
 E. S. Case, Takoma Park, D. C., three blue jays.
 Miss M. B. Cole, Washington, D. C., an alligator.
 Mrs. Mary F. Crown, Washington, D. C., a yellow-headed Amazon parrot.
 Mrs. R. S. Day, Washington, D. C., a common canary.
 Boris de Street, Washington, D. C., an alligator.
 J. R. Eddy, Lamedeer, Mont., an American badger.
 Mr. Eustis, Leesburg, Va., a red-tailed hawk.
 Dr. Cecil French, Washington, D. C., four Hungarian quail.
 Guy M. Gribble, Buckhannon, W. Va., a red-tailed hawk.
 Jesse Hand, jr., Belleplain, N. J., two king snakes.
 Mr. C. A. Holland, Fenwick, Va., a bittern.
 Clarence Howard, Washington, D. C., a copperhead snake.
 E. C. Howe, Washington, D. C., two alligators.
 W. H. Kelly, Sandusky, Ohio, two bald eagles.
 Mr. Lansdale, Washington, D. C., two common opossums.
 Carvel Leary, Washington, D. C., a guinea pig.
 Miss Frances McMullen, Largo, Fla., an alligator snapping turtle.
 C. W. Marks, Berryville, Va., a black snake.
 S. S. Paschals, Chevy Chase, Md., two zebra finches.
 L. E. Perry, Gorgona, Canal Zone, a spider monkey.
 F. W. Pilling, Washington, D. C., 10 common canaries, a red-crested cardinal
 and 2 white Java sparrows.
 Mrs. J. E. Pleitner, Washington, D. C., a green Amazon parrot.
 N. Schutz, Washington, D. C., a screech owl.
 John B. Smith, Renovo, Pa., a banded rattlesnake.
 Mrs. H. Clay Stewart, Washington, D. C., two common canaries.
 J. P. Taylor, Washington, D. C., a copperhead snake and a black snake.
 Dr. James R. Tubman, Washington, D. C., a great horned owl.
 United States Bureau of Fisheries, two northern fur seals.
 James Worcester, Washington, D. C., an alligator.
 Unknown donors, a hawk, a parakeet, and a woodchuck.

LOSSES OF ANIMALS.

The most important losses during the year were a pair of clouded leopards, a lion, and a young Alaskan brown bear from parasitism; a leucoryx, a water buck, and a nilgai, from tuberculosis; a female American bison and a caribou, in the collection for 10 years, from peritonitis; two solenodons from septicemia, and two young fur seals from enteritis and heat stroke.

Dead animals, to the number of 142, were transferred to the United States National Museum. Autopsies were made, as usual, by the Pathological Division of the Bureau of Animal Industry, United States Department of Agriculture.¹

¹The causes of death were as follows: Pneumonia, 10; tuberculosis, 8; pulmonary edema, 1; aspergillosis, 7; pseudomembranous tracheitis, 1; enteritis, 9; gastritis, 1; gastroenteritis, 7; pneumoenteritis, 1; intestinal coccidiosis, 7; peritonitis, 6; nephritis, 2; fatty degeneration of liver, 1; parasitism, 3; stomatitis, 2; strangulated hernia, 1; rupture of gizzard, 1; internal hemorrhage, 1; abscess of scrotum, 1; abscess of head, 1; unable to deliver young, 1; duodenitis, 1; colitis, 1; echinococcosis, 1; necrobacillosis, 1; pyosclaneus bacillosis, 1; porocephalosis, 1; septicemia, 3; enterotoxism, 1; cystitis, 1; endocarditis, 1; visceral gout, 1; sarcomatosis, 2; cancer of pouch, 1; leukemia, 1; icterus, 1; impaction, 3; duodenal obstruction, 1; starvation, 2; accidents and injuries, 13; killed because unfit for exhibition, 4; result of autopsy indeterminate, 3; no cause found, 4.

Statement of the collection.

ACCESSIONS DURING THE YEAR.

Presented.....	65
Received from Yellowstone National Park.....	1
Received in exchange.....	13
Lent.....	11
Purchased.....	130
Born and hatched in National Zoological Park.....	115
Total.....	335

SUMMARY.

Animals on hand July 1, 1910.....	1,424
Accessions during the year.....	335
Total.....	1,759
Deduct loss (by exchange, death, and returning of animals).....	345
On hand June 30, 1911.....	1,414

Class.	Species.	Individuals.
Mammals.....	157	636
Birds.....	186	685
Reptiles.....	33	93
Total.....	376	1,414

VISITORS.

The number of visitors to the park during the year was 521,440, a daily average of 1,428. The largest number in any one month was 95,535, in April, 1911, a daily average for the month of 3,184.

During the year there visited the park 169 schools, Sunday schools, classes, etc., with 4,966 pupils, a monthly average of 414 pupils. This number is an increase over the previous year of 14 schools, 1,063 pupils, and an increase in the monthly average of 90 pupils. While most of the classes were from the District of Columbia, 47 of them were from neighboring States, and classes came from Meriden, Hopedale, Norton, North Attleboro, Clinton, Hudson, and Whitman, Massachusetts; Dover, Peterboro, Lancaster, and Exeter, New Hampshire; Bath, Augusta, Biddeford, Gardiner, and Sanford, Maine; Bellows Falls, Vermont; Raleigh, North Carolina; Middleport (two) and Penn Yan, New York; Waynesburg, Pennsylvania; and Hartford, Connecticut.

IMPROVEMENTS.

A house for zebras, a frame building 35 feet square, was constructed, providing four good-sized stalls with yards attached. This is now occupied by a male Grant's zebra, the male Grevy's zebra, which was returned from the experiment station of the Bureau of Animal Industry at Bethesda, Maryland, after use there in breeding, and a hybrid from the latter animal and a domestic ass.

The existing yards on the west side of the antelope house were too small, and the fences around them, which were of temporary character, had seriously

deteriorated. The construction of new steel fences was begun, inclosing a considerably larger area than the former yards, and was nearly completed by the close of the year. The yards on the north and east sides of the antelope house, which had been begun during the previous year, were completed.

The temporary bird house, which had been in very bad condition, was extensively repaired. New roof covering was put on, and the wooden floor, some of the walls and cages, and much other interior work were renewed.

Some alterations were made in the large cages in the lion house to permit more convenient handling of the animals during feeding and the cleaning of the cages. The woodwork of this portion of the building was also refinished.

The public comfort room for women, which was in a very dilapidated condition, was removed to make way for the yards of the antelope house, and a new comfort room was constructed beneath the outdoor cages of the small mammal house. A small frame building for the same purpose was erected near the Adams Mill Road entrance, that portion of the park being a much frequented resort for women with young children.

A new public comfort room for men was also constructed in the basement of the antelope house, providing permanent conveniences, which are much better and more adequate than have existed heretofore.

The drainage culvert in the beaver valley was extended to the flying cage, a distance of 800 feet, thus providing sewerage, as well as for the carrying away of surface water without the erosion which had occurred previously.

Foundations were laid for cages on the east side of the small mammal house, and a concrete walk was constructed there.

Various small improvements and repairs were made. A cage was built in the lion house with a pool for the young hippopotamus, which was received in May; a paddock with shelter was built for the chamols; an inclosure and pool for fur seals; the condor cage and cage for horned owls were extensively repaired; an inclosure with shelter was built for kangaroos; an additional watch house was built; new wagon scales were set near the shop and coal vault; and the heating conduit and mains from the central heating plant were extended to the elephant house and zebra house.

The cost of this work was:

House for zebras.....	\$2, 500
New yards on west side of antelope house.....	1, 775
Completing yards on north and east sides of antelope house.....	250
Repairs to temporary bird house.....	1, 000
Alterations and repairs to lion house.....	600
Cage for hippopotamus.....	275
Paddock for chamols.....	300
Inclosure and pool for fur seals.....	275
Repairing condor and owl cages.....	350
Inclosure for kangaroos.....	75
Extending drainage culvert.....	1,500
New concrete walk and cage foundations at small mammal house, with retaining walls, etc.....	1, 050
Additional watch house.....	125
Extending heating conduit and mains.....	400
New wagon scales at shop.....	250
Accessory comfort room for women.....	350
Women's comfort room.....	750
Men's comfort room.....	750

ROADWAYS AND WALKS.

From the appropriation for reconstructing and repairing roadways and walks 4,770 linear feet, or nine-tenths of a mile of road, was treated, from 10 to 45 feet wide, averaging slightly more than 20 feet, a total of 10,700 square yards. The work varied from merely reshaping and supplying a top layer of stone to furnishing the entire thickness of roadbed material, with considerable excavating and filling in some places where the existing grades were too steep. One thousand six hundred square yards (the "concourse") were finished with tarvia. The work cost from 22 cents to \$1 per square yard, and the total amount expended for roads was \$7,220.

During the year 9,280 linear feet, or 1½ miles, of walks were laid or repaired. They were from 6 to 16 feet wide, or an average width of about 9 feet, comprising in all 9,230 square yards. Of this about 6,500 square yards was old macadam walk, the remainder gravel or dirt walks. A considerable amount of excavation and filling had to be done in certain places in order to secure reasonably uniform grades, and steps were constructed at points where the grade had before been too steep. The walks are of stone macadam, the surface treated with tarvia by the penetration method. The cost of laying them was from 35 cents to 85 cents per square yard. A considerable amount of work had to be done also in providing proper drainage. The total expenditure for walks was \$7,780.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

18308°—sm 1911—5

APPENDIX V.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1911:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, California, upon a leased plat of ground 100 feet square in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

There were no important additions to the instrument equipment of the observatory during the year.

In 1909 the Smithsonian Institution, at the expense of the Hodgkins fund, erected on the summit of Mount Whitney, California (height 14,502 feet), a stone and steel house to shelter observers who might apply to the Institution for the use of the house to promote investigations in any branch of science. While this structure is not the actual property of the Astrophysical Observatory, it affords an excellent opportunity for observations in connection with those taken on Mount Wilson.

WORK OF THE YEAR.

In order to thoroughly confirm the results obtained on the summit of Mount Whitney (4,420 meters or 14,502 feet) in 1909, discussed in my last annual report, an expedition again occupied that place in August, 1910. The personnel consisted of the director and Mr. G. F. Marsh, of Lone Pine, California. Nearly all of the equipment for spectrophotometric work had been left on Mount Whitney through the winter and was found in good condition. Additional apparatus for measuring the brightness of the sky by day and by night was carried up by pack train under the care of Mr. Elder, of Lone Pine. The good fortune which had attended the 1909 expedition failed for a moment in 1910, and one mule, carrying the silver-disk pyrhellometer and other loading, rolled off among the rocks and was killed. The pyrhellometer fortunately received no injury.

Solar-constant measurements were made successfully on Mount Whitney in 1910 on three successive days. Mr. Fowle made solar-constant observations

simultaneously on Mount Wilson. I give below the results obtained at Mount Wilson and Mount Whitney in 1909 and 1910:

	Sept. 3, 1909.	Aug. 12, 1910.	Aug. 13, 1910.	Aug. 14, 1910.
Solar constant:				
Mount Wilson.....	1.943	1.943	1.924	1.904
Mount Whitney.....	1.959	1.979	1.933	1.956

Taking the mean of the differences between the results obtained simultaneously at the two stations, it appears that the results obtained on Mount Whitney average 1.4 per cent higher than those obtained on Mount Wilson. But considering that the optical apparatus used on Mount Wilson comprised a silvered glass mirror coelostat, an ultra-violet crown glass prism, and two silvered glass mirrors, while that on Mount Whitney comprised only a quartz prism and two magnallium mirrors, and, furthermore, that the pyrheliometers employed at the two stations were read at very different temperatures, it is probable that the slight difference found between the results may be due wholly to experimental differences and implies no discrepancy due to the difference of altitude between the two stations.

This conclusion seems worth emphasizing. We have now made simultaneously solar-constant determinations at sea level (Washington), at over a mile altitude (Mount Wilson), and again at Mount Wilson, and at nearly 3 miles altitude (Mount Whitney). Although both the quantity and the quality of the solar radiation found at these stations differ very much, neither the "solar constant" nor the distribution of the solar energy in the spectrum outside the atmosphere, as fixed by the wholly independent measurements at these three stations, differs more than would be expected in view of the unavoidable small errors of observation. We seem justified in concluding that we do, in fact, eliminate the effects of atmospheric losses and actually determine the true quantity and quality of the sun's radiation outside the atmosphere as we might do if we could observe in free space with no atmosphere at all to hinder.

Expeditions to Mount Wilson have now been made in 1905, 1906, 1908, 1909, and 1910. The last, like the others, continued from May until November. In the earlier years the observations were not made daily, but in 1908, 1909, and 1910 daily determinations of the solar constant were made when possible. As stated in earlier reports, the results indicate a variability of the sun. In order to show the strength of the argument for this conclusion, I give in the accompanying figure a diagram showing all the "solar constant" values obtained in the first four years of observation (fig. 1).

The "solar constant" results lie between 1.80 and 2.00 calories per square centimeter per minute. I call particular attention to the two later years. It will be noted that successive days' results march step by step regularly from low to high values and the reverse, and that this order of march is not the exception, but almost without exception the rule. This seems to render it highly improbable that the fluctuations are due to accidental error, for such a regularity of fluctuation is incompatible with that supposition. As it has now been shown that the altitude of the observing station is immaterial, at least for altitudes below 3 miles, it seems also reasonable to conclude that the fluctuation is not due to faulty estimates of the losses of radiation in the air. Hence the most probable conclusion is that the sun actually varies from day to

day in its output of radiation within limits of from 5 to 10 per cent in quantity and in irregular periods of from 5 to 10 days. This conclusion I state tentatively. Before it can be accepted without question it must be confirmed by showing that the results obtained day after day at another equally good station, at a great distance, confirm those obtained simultaneously at Mount Wilson. Such a final test, it is now expected, will be made during the coming fiscal year.

Summary of solar-constant values.

	Wash- ington.	Mount Wilson.					Mount Whitney.	
	1902-1907	1905	1906	1908	1909	1910	1909	1910
Times observed.....	44	59	62	113	95	128	1	3
Mean value.....	1.900	1.925	1.921	1.929	1.896	1.914	1.959	1.954

¹ Other days of observation not yet ready.

General mean, 1.922 calories (15° C.) per square centimeter per minute.

Number of determinations, 405.

Other observations made on Mount Whitney.—Although the main purpose of the Mount Whitney expedition of 1910 was served by proving that the determinations of the solar constant of radiation are independent of the altitude of the observing station, advantage was taken of the unusual opportunity to make several other kinds of observations. Kapteyn's sky photometer was employed there on two successive nights to measure the relative brightness of the different regions of the night sky and to estimate the total quantity of sky illumination per square degree compared with that of a first-magnitude star. Yntema had employed similar apparatus in Holland. He found the average brightness of the Milky Way about two or three times that of nongalactic regions of the sky, such as the north polar region, but that the sky near the horizon was of about the same brightness as the Milky Way. He concluded that the sky at night is illuminated more by some terrestrial sources of light than by the stars.

The results obtained on Mount Whitney at nearly 3 miles elevation agreed in general with those of Yntema. The following is a summary of the principal points. Mean values are given:

Brightness of night sky.

[Polar brightness=1. Mount Whitney, 1909-1910.]

	Galactic latitude.				Near hor- izon.
	0° to ±5°	±15° to ±30°	±45° to ±60°	±60° to ±75°	
Relative brightness.....	2.10	1.25	1.19	1.17	1.00

The total illumination from 1 square degree of polar sky was found to be 0.0746 that of one first-magnitude star in the zenith. It is possible that the fraction just given may be a little too small, owing to a source of error discovered after the observations were ended.

Computations from the Mount Whitney results confirm Yntema's conclusion that the great increase of brightness toward the horizon can not be due to any arrangement of starlight, but must be caused by some terrestrial source of light, perhaps a continuous faint aurora.

Bolometric measurements were made on Mount Whitney to determine the relative radiation of the sky by day in all directions, as compared with the

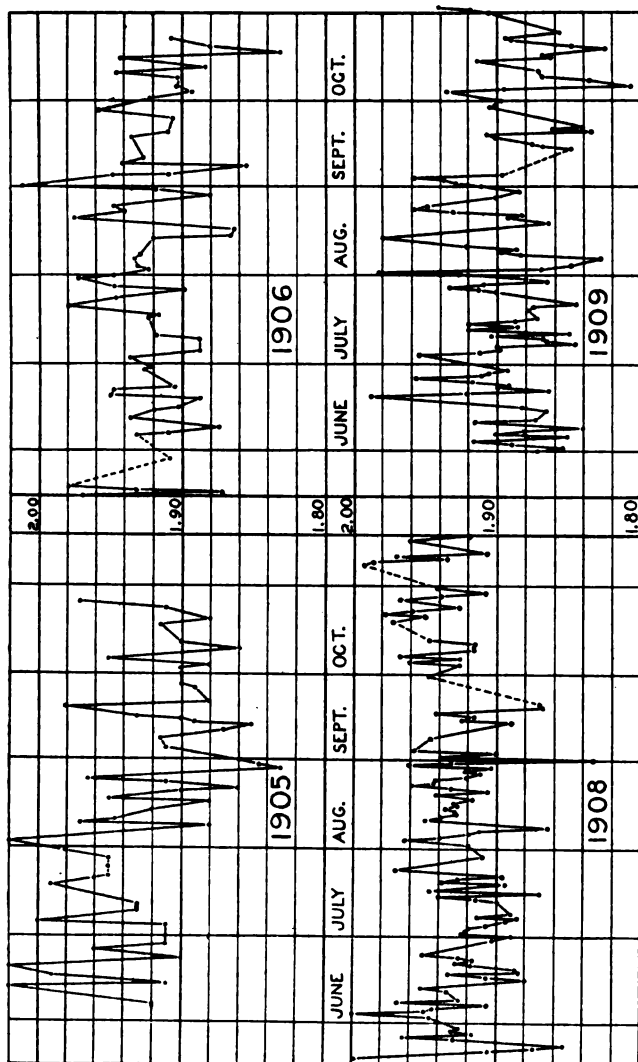


FIG. 1.—Solar constant values.

sun. These measurements were numerous and seem to have been successful, but are not yet reduced.

The sun's energy spectrum.—A summary has been prepared showing the mean result of determinations of the distribution of the sun's energy in the spectrum, as it would be found outside the atmosphere. The measurements on which it is based include Washington, Mount Wilson, and Mount Whitney work of 1903

to 1910, and have been made with many different optical systems. There is great difficulty in getting an accurate estimate of the relative losses suffered by rays of different wave lengths in traversing the spectroscop. Especially is this the case for the violet and ultra-violet rays, where these losses are greatest. The summary has shown that further determinations are needed to fix the distribution in the extreme ultra violet, and observations for this purpose were made in June, 1911, on Mount Wilson, but are not yet reduced. I give below the summary, excluding the work of 1911.

Intensities in normal solar spectrum, outside the atmosphere.

[Observed at Washington, Mount Wilson, Mount Whitney, 1903-1910.]

	μ	μ	μ	μ	μ	μ	μ
Wave length.....	0.30	0.35	0.40	0.45	0.47	0.50	0.60
Intensity.....	440	2,700	4,345	6,047	6,253	6,064	5,047
Probable error (percentage).....	50 (?)	7.3	1.5	1.4	1.8	1.9	2.1
Wave length.....	0.80	1.0	1.3	1.6	2.0	2.5	3.0
Intensity.....	2,672	1,664	897	526	245	43	12
Probable error (percentage).....	1.2	0.7	0.7	1.4	2.4	4.8	45(?)

The sun's temperature.—If we employ the so-called “Wien displacement formula,” which connects the absolute temperature of a perfect radiator with the wave length of its maximum radiation, we may proceed as follows, to estimate the solar temperature, on the assumption that the sun is a perfect radiator:

$$\lambda_{\max} T = 2930.$$

$$\text{If } \lambda_{\max} = 0.470 \mu \text{ then } T = 6230^{\circ} \text{ abs. C.}$$

Another radiation formula is that of Stefan, which connects the total quantity of radiation of a perfect radiator per square centimeter per minute with the absolute temperature. Employing this formula, still assuming the sun to be a perfect radiator, its mean distance 149,560,000 kilometers, its mean diameter 696,000 kilometers, and the mean value of the solar constant of radiation 1.922 calories per square centimeter per minute, we proceed as follows:

$$76.8 \times 10^{-12} \times \left(\frac{696,000}{149,560,000} \right)^2 T^4 = 1.922 \quad T = 5830^{\circ} \text{ abs. C.}$$

A third means of estimating the sun's probable temperature comes from comparisons of the distribution of the energy in its spectrum with that in the spectrum of the perfect radiator, as computed according to the Wien-Planck formula of spectrum energy distribution. The sun's energy curve and that of the perfect radiator at two temperatures are given in the accompanying illustration (fig. 2). It appears at once from this comparison that the sun's radiation differs greatly from that of the perfect radiator at any temperature. The solar radiation is greater in the infra-red spectrum, and much less in the ultra-violet spectrum, than that of perfect radiators giving approximately the same relative spectral distribution as the sun for visible rays. Taking everything in consideration, the solar energy spectrum seems most comparable with that of a perfect radiator between 6,000° and 7,000° in absolute temperature.

The causes of the discrepancies we have noted may be several. First, there is the influence of the selective absorption of rays in the Fraunhofer lines.

These lines are much crowded toward and within the ultra-violet spectrum, so that perhaps this indicates a principal reason for the weakness of the sun's spectrum in that region. Second, it seems probable that we are dealing with a mixture of rays from sources at different temperatures. The cause and

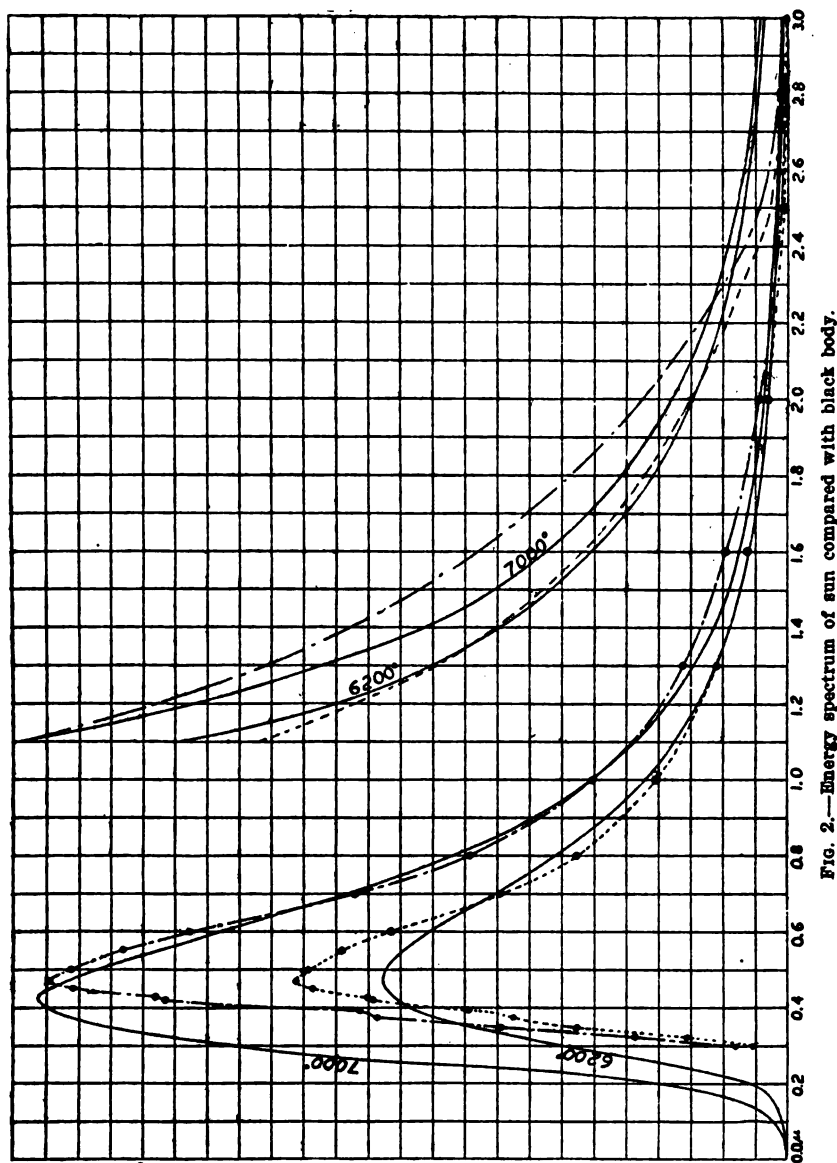


FIG. 2.—Energy spectrum of sun compared with black body.

effect of this difference may each be twofold: For, firstly, at the center of the sun's visible disk we look probably to deeper-lying and hence hotter layers than at the sun's edge, where the line of sight is oblique; and, secondly, since the transmission of the sun's atmosphere is probably like the earth's,

much less for violet and ultra-violet rays than for red and infra-red ones, we probably get infra-red rays from deeper-lying and hence hotter layers in the sun than we do ultra-violet ones.

We conclude that the solar radiation comes from sources ranging in temperature perhaps between the limits $5,000^{\circ}$ and $7,000^{\circ}$ absolute centigrade, but mostly from sources between $6,000^{\circ}$ and $7,000^{\circ}$.

Washington observations.—Further experiments have been made, under Mr. Fowle's direction, on the transmission of radiation of great wave lengths through long columns of air containing known quantities of water vapor. Many of these observations are not yet reduced, so that it is not yet proper to give a numerical summary of results. The length of the column experimented upon has been increased to 800 feet. The measurements cover the infra-red spectrum, from the A line to a wave length of about 17μ .

The observations of the water contents of the air column are made by means of pairs of wet and dry thermometers located at a number of points along the path.

The air is thoroughly stirred before readings. Check experiments by Mr. Aldrich, in which he drew the air through phosphorus pentoxide tubes and weighed the water absorbed, have confirmed the accuracy of the water-vapor determinations. Mr. Fowle has made a preliminary comparison of the upper infra-red spectrum bands ρ , σ , τ , ϕ , ψ , and Ω , as

observed through the tube with the same bands as observed through the whole atmosphere at Washington, Mount Wilson, and Mount Whitney. The results are most interesting, though not yet ripe for publication, and will probably lead to more exact knowledge of the total quantity of water vapor in the atmosphere, and its variation with the altitude of the observer and the season of the year.

Reduction of observations.—Upward of 100 days of solar-constant measurements have been made on Mount Wilson on each of the last several years. Each day requires the equivalent of three full days of computation. This work

is being done at Washington by Messrs. Fowle and Aldrich and Miss Graves and certain graphical parts of it by minor clerk Segal. The solar-constant reductions are computed as far as the middle of the observing season of 1910.

Pyrheliometry.—Additional comparisons of the Mount Wilson secondary pyrheliometers have been made with primary standard pyrheliometer No. 3. These are not yet all reduced, but such as have been finished confirm the results of the previous fiscal year, so that we may regard the scale of absolute pyrheli-

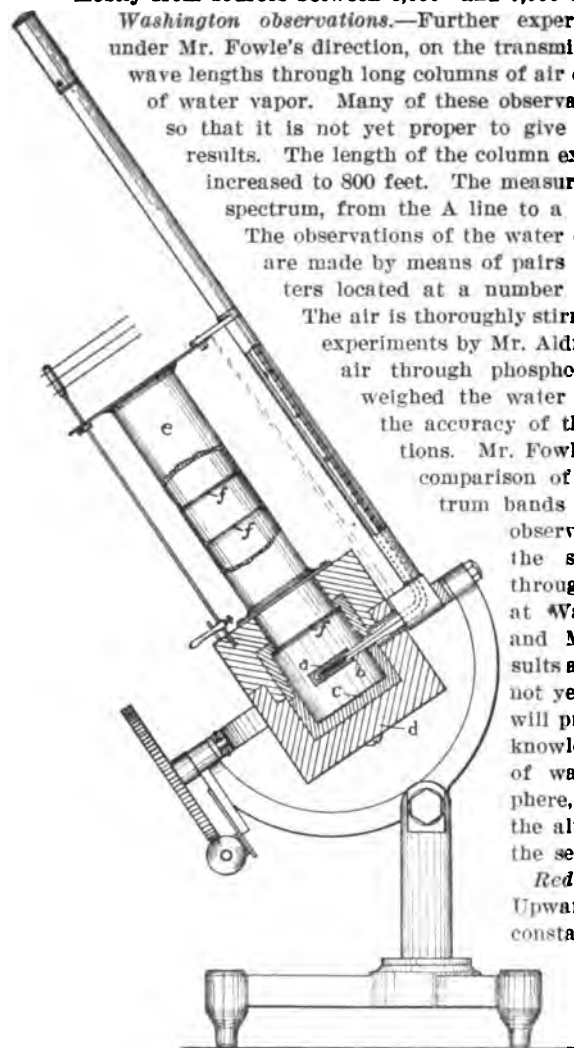


FIG. 3.—Abbot silver disk pyrheliometer.

ometry as now satisfactorily established, and with it the mean value of the solar constant of radiation for the epoch 1905-1910 as fixed at 1.922 calories per square centimeter per minute.

Additional copies of the secondary silver-disk pyrheliometer shown in the accompanying illustration (fig. 3) have been standardized and sent abroad by the Institution as loans or purchases. There have now been sent copies to Russia, Germany, France, Italy, England, Peru, Argentina, and several within the United States, making in all 10 copies now in other hands than ours, besides several now being made to order. The Institution has undertaken the business relating to furnishing these pyrheliometers, which are standardized at the Astrophysical Observatory, to promote exact knowledge of the sun and its possible variability.

SUMMARY.

The year has been distinguished by a successful expedition to Mount Whitney. The results obtained there confirm the view that determinations of the intensity of the solar radiation outside the earth's atmosphere by the spectrophotometric method of high and low sun observation are not dependent on the observer's altitude above sea level, provided the conditions are otherwise good. The Mount Whitney expedition furnished opportunities also for measurements of the brightness of the sky by day and by night, the influence of water vapor on the sun's spectrum, and the distribution of the sun's energy spectrum outside the atmosphere.

Solar-constant observations and closely related researches were continued daily at Mount Wilson until November, 1910, and were taken up again in June, 1911.

Further research tends to confirm the conclusion that the sun's output of radiation varies from day to day in a manner irregular in period and quantity, but roughly running its courses within periods of 5 to 10 days in time and 3 to 10 per cent in amplitude. Assurance seems now complete that this result will be tested in the next fiscal year by long-continued daily observations made simultaneously at two widely separated stations.

Many copies of the silver-disk secondary pyrheliometer have been standardized and sent out to observers in this and foreign countries to promote exactly comparable observations of the sun's radiation.

Measurements of the transparency, for long-wave radiation, of columns of air containing known quantities of water vapor have been continued, and promise highly interesting results.

Respectfully submitted.

C. G. ABBOT, *Director.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX VI.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report on the operations of the Library of the Smithsonian Institution for the fiscal year ending June 30, 1911, which was prepared by Mr. Paul Brockett, assistant librarian, who had charge until June 1, 1911.

The following improved methods and consolidation of work have been adopted during the past five years by the Library, in the interest of economy and efficiency:

The catalogue has been modified so as to include the author and donor cards and all previous records, thus making it necessary to consult only one file of cards for any information relating to the contents of the Library. The accession record is typewritten on sheets in accordance with the loose-leaf binding system, thus saving the time of copying titles by hand. The annuals have been transferred from the periodical record to the author catalogue, thus avoiding the making of two entries.

A new system of filing letters in numbered folders, with a card index, has been introduced, making easily accessible the correspondence which, in conjunction with the author and donor catalogue, forms a permanent record of the exchanges for the Smithsonian publications. The old files are gradually being rearranged and incorporated with the new system.

The lending of books in the reference room and periodical reading room has been placed in charge of one person, in connection with other duties.

The titles of purchased books are now entered on cards which are filed alphabetically. These card entries take the place of entries on sheets in book form, with card index.

With a thoroughly modern equipment in the way of furniture and fixtures greater improvements could be made than is possible at present.

Extension of space occupied by library.—Tentative plans have been prepared and submitted for fireproof bookstacks and bookcases for the large hall on the main floor of the Smithsonian Building to contain the libraries of the Government bureaus under the Smithsonian Institution. More definite plans are now in preparation.

International Congress of Archivists and Librarians and the International Congress of Bibliography and Documentation.—The Institution was represented by the assistant librarian, Mr. Paul Brockett, who presented a paper giving the views of the Smithsonian Institution in the matter of international exchange. At the same time he made observations on the methods and arrangement of European libraries. A separate report on this matter has been submitted by him.

ACCESSIONS.

For the Smithsonian deposit, Library of Congress, the accessions recorded numbered 3,136 volumes, 1,277 parts of volumes, 3,137 pamphlets, and 489 charts, making a total of 8,039 publications. The accession numbers run from 500,001 to 504,149.

The parts of serial publications entered on the card catalogue numbered 24,426, and 1,100 slips for completed volumes were made, and 100 cards for new periodicals and annuals.

These publications were forwarded to the Library of Congress immediately upon their receipt and entry. In their transmission 230 boxes were required, containing approximately the equivalent of 9,200 volumes. The actual number of pieces sent, including parts of periodicals, pamphlets, and volumes, was 26,286. This statement does not, however, include about 3,200 parts of serial publications secured in exchange to complete sets and transmitted separately.

Inaugural dissertations and academic publications were received from universities at the following places:

Basel.	Halle-an-der-Saale.	Paris.
Bonn.	Heidelberg.	Prague.
Berlin.	Kiel.	Rostock.
Breslau.	Leipzig.	St. Petersburg.
Cuzco.	Liege.	Tübingen.
Dorpat.	London.	Utrecht.
Freiburg i. B.	Lund.	Würzburg.
Gießen.	Marburg.	Zürich.
Graz.	New Haven.	
Greifswald.	Oviedo.	

Similar publications have been received from the technical high schools at Berlin, Braunschweig, Karlsruhe, and Munich.

The office library received 440 volumes and pamphlets, and 77 parts of volumes and charts, making a total of 517 publications. Thirteen volumes were purchased for the employees' library and one received by donation.

As already mentioned, an author catalogue, combining author and donor entries on cards of standard size was established this year and has taken the place of the previous "donor" record. Catalogue cards made for the author-donor catalogue numbered 3,199. In addition, a new finding list of 320 entries was made for the periodicals in the reading room, making a total of 3,519 cards. The recataloguing of scientific serials and annuals was commenced. The volumes recatalogued numbered 1,008.

The policy of sending foreign public documents presented to the Institution to the Library of Congress without stamping or entering has been continued, and the number of publications given above does not include these, nor does it include other publications for the Library of Congress received through the International Exchange Service.

The work of checking up and completing the Smithsonian deposit sets of publications of scientific societies and learned institutions of the world has been continued, and those of France have received special consideration.

DUPLICATES.

For a number of years about 10,000 duplicate Government documents returned by the Library of Congress, principally relating to statistics, were stored in the south tower of the Smithsonian Building. With the assistance of the International Exchanges during the previous year these publications were arranged and listed and later the larger part was turned over to the New York Public Library to complete its sets. Public documents of the United States were returned to the Superintendent of Documents.

EXCHANGES.

The establishing of new exchanges and the securing of missing parts to complete sets of publications in the Smithsonian Library required the writing of 2,600 letters, resulting in the addition of about 100 periodicals and in the receipt of about 3,200 missing parts.

The mail receipts numbered 32,647 packages, and 3,500 packages were received through the International Exchange Service. The publications contained therein were stamped and distributed for entry from the mail desk.

About 4,453 acknowledgments were made on the regular forms in addition to the letters which were written in acknowledgment of publications received in response to the requests of the Institution for exchange.

New exchanges of the annual reports of the American Historical Association from the allotment agreed upon for that purpose resulted in the acquisition of a number of publications of historical societies throughout the world, which were added to the Smithsonian deposit in the Library of Congress.

READING ROOM.

The periodical bins in the reading room were rearranged and, as already mentioned, a new finding list was made out on cards which were arranged alphabetically. Publications no longer consulted were transferred to the permanent sets, either in the Smithsonian deposit or in some one of the libraries of the Government branches of the Institution to which they belong. This gives the Institution and its branches a thoroughly useful periodical reading room.

As many of the publications kept in this room are not to be found in other American libraries, they are consulted not only by Washington investigators, but by some from other centers. During the year the scientific staff of the Institution and its branches made use of 131 bound volumes of periodicals, and 2,949 parts of scientific periodicals and popular magazines. In addition, the various bureaus of the Government continue to avail themselves of the opportunity to use these publications, as well as those in the sectional libraries of the branches of the institution, and the library is frequently visited by investigators from all parts of the world.

ART ROOM.

No additions were made to the art objects or engravings in this room during the past year. With the additional space available for the use of the Division of Graphic Arts in the National Museum, it is expected that some of the engravings will be exhibited there.

THE EMPLOYEES' LIBRARY.

The books added to this library by purchase numbered 13, and one publication was presented. By binding, 415 volumes of periodicals were made available for circulation. The total number of books borrowed was 1,876. A number of books selected especially for the purpose were sent to the National Zoological Park, as in previous years.

LIBRARIES OF THE SMITHSONIAN BRANCHES.

United States National Museum.—The congestion in the museum library reported last year has been relieved to a certain extent by the temporary employment of four cataloguers and the assignment of space on two of the

galleries in the old Museum building for sorting and arranging all the duplicate material. The duplicates were arranged, placed on temporary shelving, and roughly catalogued, and the question of disposing of such part of them as are not required in the general library or by the scientific staff will be taken up during the early part of the coming fiscal year.

Many important gifts were received during the year, and the following members of the staff have presented publications: Dr. Theodore N. Gill, Mr. J. H. Riley, Dr. C. W. Richmond, Mr. Robert Ridgway, Dr. W. H. Dall, Dr. Paul Bartsch, Mr. W. H. Holmes, Dr. Walter Hough, Dr. F. H. Knowlton, Mr. J. C. Crawford, and the late Mr. D. W. Coquillett.

The Museum library now contains 40,211 volumes, 66,674 unbound papers, and 110 manuscripts. The accessions during the year consisted of 1,911 books, 4,014 pamphlets, and 202 parts of volumes; 878 books, 1,033 complete volumes of periodicals, and 4,181 pamphlets were catalogued.

Attention has been given to the preparation of volumes for binding, with the result that 809 books were sent to the Government bindery.

The number of books, periodicals, and pamphlets borrowed from the general library amounted to 28,028, among which were 5,582 obtained from the Library of Congress and other libraries, and 4,142 assigned to the sectional libraries of the Museum.

One sectional library has been added to those already established, and the complete list now stands as follows:

Administration	Geology	Paleobotany
Administrative assistant's office	History	Parasites
Anthropology	Insects	Physical anthropology
Biology	Invertebrate paleontology	Prehistoric archeology
Birds	Mammals	Reptiles and batrachians
Botany	Marine invertebrates	Superintendent's office
Comparative anatomy	Materia medica	Taxidermy
Editor's office	Mesozoic fossils	Technology
Ethnology	Mineralogy	Vertebrate paleontology
Fishes	Mollusks	
	Oriental archeology	

The records of the Museum library consist of an authors' catalogue, an accession book, a periodical record on standard cards, and a lending record. This lending record is on cards and includes the books borrowed from the Library of Congress and other libraries for the use of the scientific staff. No changes were made either in the arrangement or in the methods of carrying on this work.

Letters requesting new exchanges and for the purpose of completing the sets already in the Museum library have been given every consideration, and a number of titles have been added in this way.

Owing to the crowded condition of the general library, it has been necessary to use the reading room as a place for receiving and distributing publications for the Museum library. The transfer and arranging of the duplicates on the galleries will relieve this condition to some extent and make it possible for that work to be done elsewhere.

Bureau of American Ethnology.—The report of this library will be made by the ethnologist in charge and incorporated in his general report.

Astrophysical Observatory.—A thorough overhauling of this library and the removal of duplicates and such other material as is not needed was undertaken during the year. As a result, the observatory now has for reference a very efficient working library relating to astrophysics and allied subjects. During

the year 93 volumes and 11 parts of volumes were added, making a total addition of 104 publications.

National Zoological Park.—A small reference library of zoological books is maintained at the park, to which 15 volumes were added during the year.

Summary of accessions.—The following statement summarizes all the accessions during the year, except for the Bureau of American Ethnology, which is separately administered:

Smithsonian deposit in Library of Congress, including parts to complete sets.....	11, 239
Smithsonian office, Astrophysical Observatory, National Zoological Park, and International Exchanges.....	676
United States National Museum Library.....	6, 127
Total.....	18, 042

Respectfully submitted.

F. W. TRUE,

Assistant Secretary in charge of Library and Exchanges.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX VII.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1911, together with a report of the proceedings at the Second International Convention of the International Catalogue of Scientific Literature held in London July 12 and 13, 1910, outlining the general condition of the whole enterprise:

The appropriation made by Congress for the maintenance of the bureau during the year was \$7,500, an increase of \$1,500 over the appropriation for the previous year.

Five persons are regularly employed in the bureau, and the services of temporary clerical assistants occasionally engaged.

In order to properly analyze and classify the many scientific works now being published in the United States it is not only desirable but necessary to obtain the advice and assistance of scientific men who are specialists in the several sciences included in the scope of the catalogue, and the increase of \$1,500 in the appropriation for the catalogue this year has made it possible to have some of the more technical papers referred to such specialists.

It is a matter of gratification to report that the utmost interest has been shown by all the scientific men who have been approached for aid, and that for a nominal sum classification citations are prepared and furnished to the bureau, thus rendering it possible for the scientific publications of the United States to be not only indexed in a thorough bibliographical manner, but also, when necessary, classified by specialists. The classification numbers used in the subject-catalogue refer to the subject-contents of the papers cited, and furnish the equivalent of an abstract of each paper indexed.

During the year 26,020 cards were sent from this bureau, as follows:

Literature of—

1901.....	3
1902.....	26
1903.....	28
1904.....	218
1905.....	129
1906.....	374
1907.....	423
1908.....	1,301
1909.....	8,836
1910.....	14,682

Total..... 26,020

Thirty-two regional bureaus are now cooperating in the preparation and publication of the International Catalogue of Scientific Literature. The catalogue consists of 17 annual volumes published by a central bureau in London. The regional bureaus are maintained by the countries they represent, usually

by direct governmental grants; the central bureau is maintained by funds derived from subscriptions to the work. Supreme control of the enterprise is vested in a body known as an international convention which met in London in 1905 and again in July, 1910, thereafter to meet every 10 years. Each country maintaining a regional bureau has the right to send delegates to this convention. The assistant in charge of the regional bureau for the United States was appointed by the Secretary of the Smithsonian Institution to represent the United States at the second international convention. The principal countries of the world sent delegates to the convention as follows: Austria, Belgium, Denmark, France, Germany, Netherlands, India, Italy, Japan, New South Wales, Russia, South Australia, Sweden, the United Kingdom, and the United States.

At the opening meeting held in the rooms of the Royal Society on July 12, 1910, Sir Archibald Geikie, president of the Royal Society, was elected chairman, and Prof. Henry E. Armstrong, F. R. S., vice chairman. The report of the executive committee was then laid before the convention. This report stated that the seven annual issues of the catalogue already published, comprising 117 volumes, had cost the London central bureau to edit, print, and publish, \$257,980, for which \$246,410 had been received from the subscribers to the catalogue. Each annual issue of 17 volumes had averaged 9,117 pages. From estimates made it appeared that when the first 10 annual issues were published the receipts and expenditures of the central bureau would probably balance, and it was thought that taking into account the extent and difficulty of the enterprise this result would not be unsatisfactory.

While the gross annual income received from subscriptions has exceeded the estimate originally made by an average of over \$8,000, the cost of editing and printing has been much greater than was originally estimated. This is due mainly to the fact that the size of each issue of the catalogue has greatly exceeded the original estimate, and also, in a lesser degree, to the fact that an edition of 1,000 copies, instead of 500, was printed. The working capital needed was also larger than originally estimated, it being necessary for the Royal Society to advance to the central bureau \$37,500, on which interest is paid.

Although the International Catalogue is understood to be a permanent organization it is one of the duties of each convention to authorize the continuation of the publication for definite periods. The following motion, therefore, was made and it was resolved:

That in view of the success already achieved by the International Catalogue of Scientific Literature and the great importance of the objects promoted by it, it is imperative to continue the publication of the catalogue at least during the period 1911-1915, and, on recommendation of the international council, during the subsequent five years 1916-1920.

After several motions concerning details of organization, it was unanimously voted "that it is most desirable that a capital fund should be obtained for the catalogue." It is now apparent that a capital fund to be at the disposal of the central bureau has been urgently needed since the beginning of the undertaking. Lacking a capital fund, it has been necessary for the central bureau to borrow money on which interest has to be paid, and on account of lack of funds it has been impossible to carry out several plans looking to the general improvement of the work. Had a capital fund been available in the beginning of the enterprise, it would not have been necessary for the subscription price to be placed at such a high figure. Consequently, a larger edition could have been disposed of and at a lower rate to each subscriber. At the session of the convention on July 13, methods of administration were discussed and the following resolution passed:

That each regional bureau be requested to prepare a list of journals in each science which the catalogue will completely index in the annual issue following the year of publication, and that the central bureau be authorized to publish the lists thus prepared.

The new List of Journals will consist of titles of publications devoted almost exclusively to scientific matters, and these journals will be given precedence in the work of the regional bureaus, though references to scientific papers published in other than regular scientific journals will eventually find a place in the catalogue. Some such action was necessary on account of the impossibility of dealing promptly with the vast number of semiscientific journals now published throughout the world, and, as promptness of publication is one of the most desirable features in an index-catalogue, it was necessary to find some means whereby an index to the more important papers could be prepared practically as soon as the papers themselves were published.

To render it possible to promptly publish future volumes of the catalogue the following resolution was adopted:

That the resolution of the year 1900 authorizing the central bureau to close these volumes at different stated dates, each volume to correspond to the literature of a period of 12 months, be confirmed.

The effect of this resolution will be that the separate volumes of the catalogue will not necessarily cover the whole calendar year but will cover a period of 12 months. A number of discussions then followed, pertaining to plans for improvements in the organization and general work of the regional bureaus. It was then resolved:

That in view of the resolution adopted unanimously by the representatives of the various countries constituting the convention, desiring the Royal Society to continue its responsibility for the publication of the International Catalogue for a further period, the committee appointed be instructed: (1) To take all possible steps to prevent reduplication by the publication of several annual and similar catalogues and indexes on the same subject, by making arrangements such as those now in force with the Zoological Society of London. (2) To obtain further assistance and cooperation in the preparation of the material of the catalogue from the principal scientific societies and academies and the organizations which collect materials for indexing scientific literature.

The idea now seems to prevail that the organization of the International Catalogue of Scientific Literature will gradually be able to cooperate with the present editors and publishers of the various scientific indexes and yearbooks, so that the annual volumes of the International Catalogue will eventually entirely supersede and take the place of all similar publications. This will not only be of common benefit to the International Catalogue and to the societies and private individuals now doing such work, but will greatly assist scientific investigators and librarians in whose interest the International Catalogue is prepared.

The question of publishing a decennial index was then discussed and it was decided that on account of the great expense necessarily involved the work could not for the present be undertaken. The matter was left for the action of the next international council, which will be held within the next two years.

During the meeting of the convention the foreign delegates were the recipients of numerous and gracious hospitalities from the Royal Society, the Royal Society Club, and individually from the English members of the convention.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

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APPENDIX VIII.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1911:

The total number of copies of publications of the Smithsonian Institution and its branches distributed during the year was 197,206. This aggregate included 643 volumes and separates of Smithsonian Contributions to Knowledge, 35,935 of Smithsonian Miscellaneous Collections, 19,622 special publications, including 2,743 volumes on the Harriman Alaska expedition; 518 publications not included in the Smithsonian series; 22,482 annual reports and bulletins of the Bureau of American Ethnology, and 110,000 copies of the various publications of the National Museum.

I. SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

The Langley Memoir on Mechanical Flight which was begun by the late Secretary Langley in 1904, and continued by Mr. Charles M. Manly, assistant in charge of experiments, was in type and nearly ready for distribution at the close of the year. This work forms a part of volume 27 of the Contributions to Knowledge.

II. SMITHSONIAN MISCELLANEOUS COLLECTIONS.

In the series of Smithsonian Miscellaneous Collections were published (1) cover and preliminary pages for volume 51; (2) two papers of volume 53, with cover, preliminary pages, and index, completing that volume; (3) thirteen papers of volume 56; (4) four papers of volume 57; (5) and the Smithsonian Physical Tables, by F. E. Fowle, forming part of volume 58.

The issues of the Smithsonian Miscellaneous Collections during the year were as follows:

- 1928. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 54. Octavo. Pages v.
- 1934. Cambrian Geology and Paleontology. No. 6: *Olenellus* and other Genera of the Mesonacidae. By Charles D. Walcott. Published August 12, 1910. Octavo. Pages 231-422 (unpaged index), with Plates 23-44. Volume 53, No. 6.
- 1939. Cambrian Geology and Paleontology. No. 7: Pre-Cambrian Rocks of the Bow River Valley, Alberta, Canada. By Charles D. Walcott. Published August, 1910. Octavo. Pages 423-431, with Plates 45-47. Volume 53. No. 7.
- 1940. Cambrian Geology and Paleontology. II. Abrupt Appearance of the Cambrian Fauna on the North American Continent. By Charles D. Walcott. Published August 18, 1910. Octavo. Pages 1-16. Volume 57, No. 1.

1941. Notes on a Horn-feeding Lepidopterous Larva from Africa. By August Busck. Published July, 1910. Octavo. Pages 2, with 2 plates. Volume 56, No. 8.
1942. Description of Seven New Species of East African Mammals. By Edmund Heller. Published July 22, 1910. Octavo. Pages 5, with three plates. Volume 56, No. 9.
1943. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 51. Octavo.
1944. Smithsonian Physical Tables. Fifth Revised Edition. By F. E. Fowle, aid, Smithsonian Astrophysical Observatory. Published May 17, 1911. Octavo. Pages xxxiv, 318. Volume 58, No. 1.
1945. New Landshells from the Smithsonian African Expedition. By William Healey Dall. Published July 22, 1910. Octavo. Pages 3. Volume 56, No. 10.
1946. Development of the Digestive Canal of the American Alligator. By Albert M. Reese, Professor of Zoology, West Virginia University. Published October 29, 1910. Octavo. Pages 25, with 15 plates. Volume 56, No. 11.
1947. The Flying Apparatus of the Blow-Fly. By Dr. Wolfgang Ritter. Hodgkins Fund. Published May 11, 1911. Octavo. Pages 76, with 20 plates. Volume 56, No. 12.
1949. Cambrian Geology and Paleontology. By Charles D. Walcott. Cover, preliminary pages, and index for papers 1 to 7. Published June 1, 1911. Octavo. Pages ix, 433-498. Volume 53.
1988. Two New African Ratels. By N. Hollister. Published October 10, 1910. Octavo. Pages 3. Volume 56, No. 13.
2003. Descriptions of Ten New African Birds. By Edgar A. Mearns. Published December 23, 1910. Octavo. Pages 7. Volume 56, No. 14.
2004. New Species of Insectivores from British East Africa, Uganda, and the Sudan. By Edmund Heller. Published December 23, 1910. Octavo. Pages 8, with one plate. Volume 56, No. 15.
2005. Some Results of Recent Anthropological Exploration in Peru. By Aleš Hrdlička. Published April 26, 1911. Octavo. Pages 16, with four plates. Volume 56, No. 16.
2006. New Species of Rodents and Carnivores from Equatorial Africa. Published February 28, 1911. Octavo. Pages 16. Volume 56, No. 17.
2007. Bibliography of the Scientific Writings of R. E. C. Stearns. By Miss Mary R. Stearns. With Biographical Sketch by William H. Dall. Published April 12, 1911. Octavo. Pages 15, with one plate. Volume 56, No. 18.
2008. The Silver Disk Pyrheliometer. By C. G. Abbot. Published March 31, 1911. Octavo. Pages 10, with one plate. Volume 56, No. 19.
2009. Cambrian Geology and Paleontology. II. No. 2. Middle Cambrian Merostomata. By Charles D. Walcott. Published April 8, 1911. Octavo. Pages 17-40, with six plates. Volume 57, No. 2.
2010. Descriptions of Fifteen New African Birds. By Edgar A. Mearns. Published April 17, 1911. Octavo. Pages 11. Volume 56, No. 20.
2011. Cambrian Geology and Paleontology. II. No. 3: Middle Cambrian Holothurians and Medusæ. By Charles D. Walcott. Published June 13, 1911. Octavo. Pages 41-68, with Plates 8-13. Volume 57, No. 3.
2012. Cambrian Geology and Paleontology. II. No. 4: Cambrian Faunas of China. By Charles D. Walcott. Published June 17, 1911. Octavo. Pages 69-108, with Plates 14-17. Volume 57, No. 4.

The following papers of Smithsonian Miscellaneous Collections were in press at the close of the year:

2014. Cambrian Geology and Paleontology. II. No. 5: Middle Cambrian Annelids. By Charles D. Walcott. Pages 109-144, with Plates 18-23. Volume 57, No. 5.

2015. Description of a New Genus and Species of Hummingbird from Panama. By E. W. Nelson. Volume 56, No. 21.

III. SMITHSONIAN ANNUAL REPORTS.

The annual report for 1909 was published in January, 1911.

1906. Annual Report of the Board of Regents of the Smithsonian Institution, showing Operations, Expenditures, and Conditions of the Institution for the year ending June 30, 1909. Octavo. Pages x, 751, with 73 plates and 4 maps. Containing publications 1915, 1916, and 1950-1985.

Small editions of the following papers, forming the general appendix of the Annual Report of the Board of Regents for 1909, were issued in pamphlet form:

1950. The Future of Mathematics. By Henri Poincaré. Pages 123-140.

1951. What Constitutes Superiority in an Airship. By Paul Renard. Pages 141-156.

1952. Researches in Radiotelegraphy. By J. A. Fleming. Pages 157-183, with two plates.

1953. Recent Progress in Physics. By Sir J. J. Thomson. Pages 185-205.

1954. Production of Low Temperatures, and Refrigeration. By L. Marchia. Pages 207-224.

1955. The Nitrogen Question from the Military Standpoint. By Charles E. Munroe. Pages 225-236.

1956. Simon Newcomb. By Ormond Stone. Pages 237-242, with one plate.

1957. Solar-radiation Researches, by Jules César Janssen. By H. de le Baume Pluvinel. Pages 243-251, with one plate.

1958. The Return of Halley's Comet. By W. W. Campbell. Pages 253-259, with four plates.

1959. The Upper Air. By E. Gold and W. A. Harwood. Pages 261-269.

1960. The Formation, Growth, and Habit of Crystals. By Paul Gaubert. Pages 271-278.

1961. The Distribution of Elements in Igneous Rocks. By Henry S. Washington. Pages 279-304.

1962. The Mechanism of Volcanic Action. By H. J. Jonston-Lavis. Pages 305-315, with 3 plates.

1963. Conservation of Natural Resources. By James Douglas. Pages 317-329.

1964. The Antarctic Land of Victoria. By Maurice Zimmermann. Pages 331-353.

1965. Some Results of the British Antarctic Expedition, 1907-9. By E. H. Shackleton. Pages 355-368, with 6 plates and 3 maps.

1966. The Oceanography of the Sea of Greenland. By D. Damas. Pages 369-383, with 2 plates.

1967. From the Niger, by Lake Chad, to the Nile. By Lieut. Boyd Alexander. Pages 385-400, with 3 plates.

1968. Mesopotamia: Past, Present, and Future. By Sir William Willcocks. Pages 401-416, with 4 plates and 1 map.

1969. Albert Gaudry and the Evolution of the Animal Kingdom. By Ph. Glangeaud. Pages 417-429.

Charles Darwin. By August Weismann. Pages 431-452.

1971. Present Problems in Plant Ecology: Problems of Local Distribution in Arid Regions. By Volney M. Spalding. Pages 453-463.
1972. The Instinct of Self-concealment and the Choice of Colors in the Crustacea. By Romuald Minkiewicz. Pages 465-485.
1973. The Origin and Development of the Parasitical Habits in the Cuculidæ. By C. L. Barrett. Pages 487-492, with 2 plates.
1974. Some Remarks on the Protective Resemblance of South African Birds. By Alwin Haagner. Pages 493-504, with 2 plates.
1975. An inquiry into the History of the Current English Names of North American Land Birds. By Spencer Trotter. Pages 505-519.
1976. Condition of Wild Life in Alaska. By Madison Grant. Pages 521-529, with 1 plate.
1977. Recent Discoveries Bearing on the Antiquity of Man in Europe. By George Grant MacCurdy. Pages 531-583, with 18 plates.
1978. European Population of the United States. By W. Z. Ripley. Pages 585-606.
1979. The Republic of Panama and its People. By Eleanor Yorke Bell. Pages 607-637, with 14 plates.
1980. Ceramic Decoration: Its Evolution and Applications. By Louis Franchet. Pages 639-650.
1981. Some Notes on Roman Architecture. By F. T. Baggallay. Pages 651-667, with 4 plates.
1982. The Relation of Science to Human Life. By Adam Sedgwick. Pages 669-682.
1983. Intellectual Work among the Blind. By Pierre Villey. Pages 683-702.
1984. The Relation of Mosquitoes, Flies, Ticks, Fleas, and other Arthropods to Pathology. By G. Marotel. Pages 703-722.
1985. Natural Resistance to Infectious Disease and its Reinforcement. By Simon Flexner. Pages 723-738.

The report of the executive committee and Proceedings of the Board of Regents of the Institution, as well as the report of the Secretary, for the fiscal year ending June 30, 1910, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in December, 1910, as follows:

2001. Report of the Executive Committee and Proceedings of the Board of Regents for the year ending June 30, 1910. Pages 21, with 1 plate.
2002. Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1910. Pages 89.

The general appendix to the Smithsonian Report for 1910 was in type, but actual presswork could not be completed before the close of the fiscal year. In the general appendix are the following papers:

- Melville Weston Fuller, 1833-1910, by Charles D. Walcott.
- Ornamentation of Rugs and Carpets, by Alan S. Cole.
- Recent Progress in Aviation, by Octave Chanute.
- Progress in Reclamation of Arid Lands in the Western United States, by F. H. Newell.
- Electric Power from the Mississippi River, by Chester M. Clark.
- Safety Provisions in the United States Steel Corporation, by David S. Beyer.
- The isolation of an Ion, a Precision Measurement of its Charge, and the Correction of Stokes's Law, by R. A. Millikan.
- The Telegraphy of Photographs, Wireless and by Wire, by T. Thorne Baker.
- Modern Ideas on the Constitution of Matter, by Jean Becquerel.
- Some Modern Developments in Methods of Testing Explosives, by Charles E. Munroe.

Sir William Huggins, by W. W. Campbell.

The Solar Constant of Radiation, by C. G. Abbot.

Astronomical Problems of the Southern Hemisphere, by Heber D. Curtis.

The Progressive Disclosure of the Entire Atmosphere of the Sun, by Dr. H. Deslandres.

Recent Progress in Astrophysics in the United States, by J. Bosler.

The Future Habitability of the Earth, by Thomas Chrowder Chamberlin.

What Is Terra Firma? A review of current research in isostasy, by Bailey Willis.

Transpiration and the Ascent of Sap, by Henry H. Dixon.

The Sacred Ear-Flower of the Aztecs, by William Edwin Safford.

Forest Preservation, by Henry S. Graves.

Alexander Agassiz, 1835-1910, by Alfred Goldsborough Mayer.

Recent Work on the Determination of Sex, by Leonard Doncaster.

The Significance of the Pulse Rate in Vertebrate Animals, by Florence Buchanan.

The Natural History of the Solitary Wasps of the Genus *Synagris*, by E. Roubaud.

A Contribution to the Ecology of the Adult Hoatzin, by C. William Beebe.

Migration of the Pacific Plover to and from the Hawaiian Islands, by Henry W. Henshaw.

The Plumages of the Ostrich, by Prof. J. E. Duerden.

Manifested Life of Tissues Outside of the Organism, by Alexis Carrel and Montrose T. Burrows.

The Origin of Druidism, by Julius Pokorny.

Geographical and Statistical View of the Contemporary Slav Peoples, by Lubor Niederle.

The Cave Dwellings of the Old and New Worlds, by J. Walter Fewkes.

The Origin of West African Crossbows, by Henry Balfour.

Sanitation on Farms, by Allen W. Freeman.

Epidemiology of Tuberculosis, by Robert Koch.

IV. SPECIAL PUBLICATIONS.

The following special publications were issued during the year:

1871. A Reprint of Smithsonian Mathematical Tables: Hyperbolic Functions. By George F. Becker and C. E. Van Orstrand. Published June, 1911. Octavo. Pages ii, 321.

1932. Classified list of Publications available for distribution May, 1910. Octavo. Pages 37. July, 1910.

1938. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 1 to 35. Octavo. Pages 62. July, 1910.

1989. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 26 to 29. Octavo. Pages 63-68. October, 1910.

The following special publication was in type but had not been issued at the close of the year.

2013. Opinions Rendered by the International Commission on Zoological Nomenclature. Opinions 30-37.

HARRIMAN ALASKA SERIES.

The Institution received from Mrs. Edward H. Harriman several thousand copies of volumes descriptive of the Harriman expedition to Alaska in 1899. Special Smithsonian title pages were added to the volumes before distribution by the Institution. The subjects were as follows:

1990. Volume I: Narrative, Glaciers, Natives. By John Burroughs, John Muir, and George Bird Grinnell. Pages 184, with 60 plates and 4 maps.

1991. Volume II: History, Geography, Resources. By William H. Dall, Charles Keeler, B. E. Fernow, Henry Gannett, William H. Brewer, C. Hart Merriam, George Bird Grinnell, and M. L. Washburn. Pages 200, with 64 plates and 1 map.
1992. Volume III: Glaciers and Glaciation. By Grove Karl Gilbert. Pages 231, with 17 plates and 1 map.
1993. Volume IV: Geology and Paleontology. By B. K. Emerson, Charles Palache, William H. Dall, E. O. Ulrich, and F. H. Knowlton. Pages 173, with 33 plates and 1 map.
1994. Volume V: Cryptogamic Botany. By J. Cardot, Clara E. Cummings, Alexander W. Evans, C. H. Peck, P. A. Saccardo, De Alton Saunders, I. Theriot, and William Trelease. Pages 424, with 44 plates.
1995. Volume VIII¹: Insects. Part I. By William H. Ashmead, Nathan Banks, A. W. Caudell, O. F. Cook, Rolla P. Currie, Harrian G. Dyar, Justus Watson Folsom, O. Heidemann, Trevor Kincaid, Theo. Pergande, and E. A. Schwarz. Pages 238, with 17 plates.
1996. Volume IX: Insects. Part II. By William H. Ashmead, D. W. Coquillett, Trevor Kincaid, and Theo. Pergande. Pages 284, with 4 plates.
1997. Volume X: Crustaceans. By Mary J. Rathbun, Harriet Richardson, S. J. Holmes, and Leon J. Cole. Pages 337, with 26 plates.
1998. Volume XI: Nemerteans. By Wesley R. Coe. Bryozoans. By Alice Robertson. Pages 251, with 25 plates.
1999. Volume XII: Enchytræids. By Gustav Eisen. Tubicolous Annelids. By Katherine J. Bush. Pages 355, with 44 plates.
2000. Volume XIII: Land and Freshwater Mollusks. By William H. Dall. Hydroids. By C. C. Nutting. Pages 250, with 15 plates.

V. PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the Proceedings of the United States National Museum; and (c) the Bulletin of the United States National Museum, which includes the Contributions from the United States National Herbarium. The editorship of these publications is in charge of Dr. Marcus Benjamin.

The publications issued during the year comprised the annual report for 1910; papers 1750 to 1771 of volume 38, proceedings; papers 1772 to 1845 of volumes 39 and 40, proceedings; papers 1846, 1847, 1849-1852, 1854, and 1855 of volume 41, proceedings; five bulletins and seven parts of volumes of Contributions from the National Herbarium.

The bulletins were as follows:

- No. 71. A Monograph of the Foraminifera of the North Pacific Ocean. Part II, Textulariidae. By Joseph Augustine Cushman.
- No. 73. An account of the Beaked Whales of the Family Ziphiidae in the Collection of the United States National Museum, with Remarks on some Specimens in other American Museums. By Frederick W. True.
- No. 74. One some West Indian Echinoids. By Theodor Mortensen.
- No. 75. North Pacific Ophiurans in the Collection of the United States National Museum. By Hubert Lyman Clark.
- No. 76. Asteroidea of the North Pacific and Adjacent Waters. By Walter Kendrick Fisher.

In the series of Contributions from the National Herbarium there appeared: Volume 15. The North American Species of *Panicum*. By A. S. Hitchcock and Agnes Chase.

¹ Volumes VI and VII have not yet been prepared for publication.

- Volume 14, Part 2. History of the Coconut Palm in America. By O. F. Cook.
- Volume 13, Part 6. The Type Localities of Plants First Described from New Mexico. A Bibliography of New Mexican Botany. By Paul C. Standley.
- Volume 13, Part 7. A Preliminary Treatment of the Genus *Castilla*. By Henry Pittier.
- Volume 13, Part 8. The Genus *Talinum* in Mexico, by J. N. Rose and Paul C. Standley; and Two new Species of *Harperella*, by J. N. Rose.
- Volume 13, Part 9. Studies of Mexican and Central American Plants. No. 7. By J. N. Rose.
- Volume 13, Part 10. Miscellaneous Papers. By Albert W. C. T. Herre, William H. Brown, Joseph H. Painter, Paul C. Standley, Edward S. Steele, and E. A. Goldman.

VI. PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in detail in another appendix of the Secretary's report. The editorial work is in charge of Mr. J. G. Gurley.

The following eight bulletins were published by the bureau during the year:

- Bulletin 30. Handbook of American Indians North of Mexico. Edited by Frederick Webb Hodge. Part 2. Published 1911. Octavo. Pages iv, 1221, with many figures.
- Bulletin 37. Antiquities of Central and Southeastern Missouri. By Gerard Fowke. (Report on explorations made in 1906-1907 under the auspices of the Archaeological Institute of America.) Published 1910. Octavo. Pages vii, 116, with 19 plates and 20 figures.
- Bulletin 40. Handbook of American Indian Languages. By Franz Boas. Part 1. With illustrative sketches by Roland B. Dixon (Maidu), P. E. Goddard (Athapaskan: Hupa), William Jones, revised by Truman Michelson (Algonquian), John R. Swanton (Tlingit, Haida), William Thalbitzer (Eskimo); (Franz Boas: Introduction, Chinook, Kwakiutl, Tsimshian; John R. Swanton and Franz Boas, Siouan). Published 1911. Octavo. Pages vii, 1069.
- Bulletin 43. Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico. By John R. Swanton. Published 1911. Octavo. Pages vii, 387, with 32 plates (including 1 map) and 2 figures.
- Bulletin 44. Indian Languages of Mexico and Central America, and their Geographical Distribution. By Cyrus Thomas, assisted by John R. Swanton. Accompanied with a linguistic map. Published 1911. Octavo. Pages vii, 108, and 1 map.
- Bulletin 45. Chippewa Music. By Frances Densmore. Published 1910. Octavo. Pages xix, 216, with 12 plates, 8 figures, and many musical pieces.
- Bulletin 50. Preliminary Report on a Visit to the Navaho National Monument, Arizona. By Jesse Walter Fewkes. Published 1911. Octavo. Pages vii, 35, with 22 plates and 3 figures.
- Bulletin 51. Antiquities of the Mesa Verde National Park: Cliff Palace. By Jesse Walter Fewkes. Published 1911. Octavo. Pages 82, with 35 plates and 4 figures.

VII. PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

There were no new publications issued by the Astrophysical Observatory during the year.

VIII. AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution and are

communicated to Congress under the provisions of the act of incorporation of the association.

Volume I of the report for the year 1908, sent to the printer in June, 1909, was published in July, 1910. Its contents were as follows:

Report of the Proceedings of the Twenty-fourth Annual Meeting of the American Historical Association. By Waldo G. Leland, secretary.

Report of the Proceedings of the Fifth Annual Meeting of the Pacific Coast Branch. By Jacob N. Bowman, secretary of the branch.

Report of Conference on Relations of Geography to History. By Erle Sparks.
Proceedings of Conference on History in Secondary Schools. Edited by Andrew C. McLaughlin.

Report of Conference on Research in English History. By Edward P. Cheyney.
Report of Conference on Research in American Colonial and Revolutionary History. By Herbert L. Osgood.

Report of Conference on Research in Southern History. By Lyon G. Tyler.

Report on Fifth Annual Conference on the Problems of State and Local Historical Societies. By St. George L. Sioussat.

The Viceroy of New Spain in the Eighteenth Century. By Don E. Smith.

Notes Supplementary to any Edition of Lewis and Clark. By Frederick J. Teggart.

The Historical Value of the Census Records. By Joseph A. Hill.

The American Newspapers of the Eighteenth Century as Sources of History. By William Nelson.

The Wilderness Campaign:

1. **Grant's Conduct of the Wilderness Campaign.** By Gen. Edward P. Alexander, Confederate States Army.

2. **Lee's Conduct of the Wilderness Campaign.** By Col. William R. Livermore, United States Army.

3. **The Wilderness Campaign from Our Present Point of View.** By Maj. Eben Swift, United States Army.

Ninth Annual Report of the Public Archives Commission. By Herman V. Ames, chairman.

Appendix A. Report on the Archives of the State of Maine. By Allen Johnson.

Appendix B. Report on the Archives of the State of Missouri. By Jonas Viles.

Appendix C. Report on the Archives of the State of Washington. By Jacob N. Bowman.

Appendix D. List of the Journals of the Councils and Assemblies and the Acts of the 13 Original Colonies in America Preserved in the Public Record Office, London. Edited by Charles M. Andrews.

Volume II of the 1908 report, sent to the printer April 26, 1910, had not been entirely completed June 30, 1911. It will be made up, for convenience, in two parts, pages 1-807. 808-1617, containing Parts II and III of Texas Diplomatic Correspondence. Edited by Prof. George P. Garrison.

The manuscript of the 1909 report, to form one volume, was sent to the printer January 10, 1911, and was practically all in type before June 30, 1911.

The manuscript of the 1910 report was sent to the printer June 3, 1911.

IX. SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Thirteenth Annual Report of the National Society of the Daughters of the American Revolution, for the year ending October 11,

1910, was received from the society February 24, 1911, and was communicated to Congress on February 27, in accordance with the act of incorporation of that organization.

X. SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution as well as those offered for printing in the Smithsonian Miscellaneous Collections. The committee also considered forms of routine blanks and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-four meetings were held and 115 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

Dr. CHARLES W. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX IX.

REPORT ON CONGRESS OF ARCHIVISTS AND LIBRARIANS, AND CONGRESS OF BIBLIOGRAPHY AND DOCUMENTATION.

SIR: I have the honor to present the following report as the representative of the Smithsonian Institution at the International Congress of Archivists and Librarians and the International Congress of Bibliography and Documentation, held at Brussels, Belgium, in August, 1910.

The Congress of Bibliography and Documentation, the first of the two congresses at Brussels, held its meetings from Thursday, August 25, through Saturday, August 27. On the printed list of members there were enrolled 24 associations, bureaus, and other organizations; 34 individual libraries and other institutions; and 160 persons by name, including duplications on lists. Forty-six countries were scheduled as in relation with the congress or with the Institut International de Bibliographie, under whose auspices this congress was held, and there were actually present representatives from at least 16 countries, including, besides the United States, Great Britain, France, Belgium, the Netherlands, Germany, Austria, Russia, Sweden, Switzerland, Spain, Bulgaria, Denmark, Norway, Monaco, and Turkey, about a hundred persons being actually present at most of the meetings.

This congress was officially opened by M. Paul Otlet, one of the secretaries. He spoke of the work of the Institut International de Bibliographie in collecting catalogue cards for every known scientific publication and their arrangement according to the Dewey decimal classification system; also an author's catalogue arranged alphabetically; a collection of picture postal cards of institutions and public buildings from all parts of the world, as well as of prominent persons, and a collection of photographic negatives covering all subjects, from which prints could be made, for persons pursuing a certain line of study. He explained that by documentation was meant the collection and preserving for reference of a series of newspaper and magazine clippings with their illustrations. He referred to the International Exchange Service and mentioned in glowing terms the work of the Smithsonian Institution in organizing and conducting the service in the United States. The congress then proceeded to consider the following subjects:

I. Documents:

1. Books, reviews, journals;
2. Illustrations, foreign photographs;
3. Archives, ancient and administrative.

II. Works and collections:

1. Editing;
2. Library cataloguing.
3. Collections;
4. Encyclopedic arrangement.

III. Methods:

1. Cards;
2. Rules and classification.

IV. Service, loan copies and exchanges:

1. Partial, general, and special;
2. National;
3. International, special;
4. International, scientific.

The subject of "International Exchanges" was briefly reviewed, and the following resolution was passed:

It is desirable to promote further developments of international exchange service, especially in obtaining frequent dispatch, in increasing the number of countries taking part in the international convention, and in providing for gratuitous transmission of all correspondence relative to request for exchanges, to the receipts for publications and to their return. It is especially desirable to admit free or beneficial associations and institutions to such exchange.

It is desirable that the Smithsonian Institution, the initiator of the service of international exchanges, should itself promote the revision of the international convention of 1885 for the purpose of realizing these improvements.

The congress officially visited the Congo Museum at Tervueren and closed with a banquet on the evening of August 27.

The Congress of Archivists and Librarians, second to assemble, but first in point of numbers and scope, met at Brussels from Sunday, August 28, through Wednesday, August 31, under the auspices of the Association of the Belgian Archivists and Librarians, M. Louis Stainier, administrator-inspector of the Royal Library of Belgium, being the official in charge of the preliminary preparations. The printed list showed 18 countries represented by national commissions (with especial reference to archives), 12 countries represented by official delegates, delegations from 9 Belgian learned societies, 49 libraries and other institutions entered on the registry and 389 individual names, these last, of course, representing the personnel of the representative delegations as well as individual members. These 389 enrolled participants represented 21 different countries, including, besides the United States, England, Canada, Germany, France, Belgium, Holland, Austria, Hungary, Spain, Switzerland, Portugal, Russia, Italy, Brazil, Cuba, Denmark, Sweden Norway, Luxemburg, and Monaco.

This congress was convened on the afternoon of the 28th of August with addresses of welcome, and immediately divided into two sections, the archivists and the librarians, which held separate meetings. My time was largely devoted to the library section, and the discussions relating particularly to library methods included cataloguing, classification, and the placing of books upon the shelves. My paper on the International Exchange Service, having been printed in advance and distributed, was read by title. This paper is as follows:

There is no more important subject to be discussed at the Congrès International des Archivistes et des Bibliothécaires than that of the international exchanges, as the value of that service to libraries can not be overestimated. The time has come when the scientific and learned institutions, the public, the research workers, and the students of literature demand the scientific and literary publications of the world.

Considering the question "Dans quel sens a-t-il lieu de réorganiser et d'étendre le service des échanges internationaux" from an American point of view, it does not appear that reorganization is what is needed, for a system of international exchanges working with the hearty cooperation of all nations has not yet ever been developed on the lines of the existing conventions.

The present international exchange service is operating under two conventions made between certain powers, and the work is based upon them. One of these, signed at Brussels in 1886 and officially proclaimed in 1889, made provision for the exchange of official documents and scientific and literary publications. The other, which was concluded and proclaimed at the same time, provided for the immediate exchange of the official journal, as well as of the parliamentary annals and documents of the contracting parties. The

conventions were broadly worded and allowed for the adherence of other states than those that became signatories at the time. The signers were the plenipotentiaries of the United States of America, Belgium, Brazil, Italy, Portugal and the Algarves, Servia, Spain, and the Swiss Confederation. Later the Argentine Republic, Paraguay, and Uruguay signified their adherence, while Bolivia, Chile, Colombia, Costa Rica, France, Liberia, the Netherlands, New South Wales, Peru, Queensland, and Russia have established international exchange bureaus without, however, giving their formal adherence to the conventions. From this it will be seen that there are eleven states that have adhered to the conventions and an equal number that have established bureaus without adherence, while Great Britain, Germany, and the other countries contribute no funds toward the organization of this movement.

It is therefore obvious that under the existing conditions it is not reorganization but organization that is needed, and this may readily be accomplished under the conventions now in force, as they form a firm foundation for a great international institution. The provisions in these conventions made twenty years ago may need revision in order to conform to recent international advancement, and it is possible that the powers that have already agreed to the conventions and lent their support might be willing to reopen them, provided that the powers that have not come in are willing to join in the organization of an international exchange service.

The international exchanges as now carried on are of two classes—scientific and literary publications and official Government publications. The first named of these is of the utmost importance to the cause of education, both scholastic and technical, which the present service has materially advanced by enabling individuals and institutions of learning to disseminate knowledge without restriction and practically without cost to themselves. The scientific institutions are appreciating more and more the fact that their endowments are entirely inadequate to provide for the many calls made upon them, and if in addition to printing their own publications they should have to purchase those of foreign institutions and pay the cost of transportation it would mean that some part of their work would have to be abandoned. It is therefore to a system of international exchanges that they must look for relief in this matter.

The Government exchanges are necessary in order that Governments may ascertain what is being accomplished along similar lines in other countries, and as such publications are issued at the expense of the Governments they should also be distributed at their expense.

The International Exchange Service of the United States is under the direction of the Smithsonian Institution, and was originally inaugurated for the purpose of transmitting publications presented by institutions and individuals in the United States to correspondents abroad, in exchange for like contributions from such recipients, as one of the most efficient means for the "diffusion of knowledge among men," and the entire expense, including that for the exchange of documents published by the Government from 1850 to 1861, was paid from the private funds of the Institution.

Through the action of Congress, upon recommendation of the Department of State, the Smithsonian Institution is recognized by the United States Government as the American agency for the international exchange of governmental, scientific, and literary publications. By the congressional resolutions passed in 1867 and 1901 a certain number of United States Government publications are set aside for exchange with those of foreign countries, to be sent regularly to designated depositories. In accordance with those resolutions there are now forwarded abroad 55 full sets of United States official publications and 33 partial sets; the official journal of the proceedings of Congress, the Congressional Record, is transmitted by mail daily to each of the Parliaments that is willing to reciprocate.

During the fiscal year ending June 30, 1900, the number of packages forwarded through the international exchanges of the United States amounted to 228,875. These packages were sent direct from this country to the one for which they were intended, and from long experience this has been found to be the quickest and most satisfactory method. During the last year nearly 2,000 boxes were shipped in this way without the loss of a single consignment. Shipments are made regularly at least once a month, should the sending be but one package, and to the larger countries every week.

A card index is kept of all correspondents, and upon these cards are recorded the packages sent and received by each institution and individual.

There are now in the United States 3,900 institutions and 8,000 individuals recorded in this index, while the foreign institutions number 16,500 and individuals 34,232. A list of the foreign societies and institutions is published from time to time under the title of "International exchange list," the latest issue being that of 1904.

The public documents received from abroad in exchange are placed in the Library of Congress. The publications received from the scientific and learned societies and institutions of the world form an important part of the Library of the Smithsonian Institution, and while these remain the property of the Institution they are in great part deposited in the Library of Congress.

The needs of the international exchanges under present conditions may be summarized as follows: The adherence of all the civilized nations of the world to the present conventions. The members of the Congress of Archivists and Librarians can do much to further the movement by lending their efforts to arouse the interest of the scientific and literary institutions and societies and governmental authorities in their respective countries, to the end that official action may be taken. The scientific institutions and societies of each country should examine the workings of the international exchange system and solicit exchange of publications from like societies abroad, using the service as a medium of transmission.

Governments should provide a sufficient number of sets of their official publications for exchange purposes in order that each country may have a full set if desired, and in addition there should be copies of the official journals of the Parliaments, or similar bodies, for the interparliamentary exchanges.

Bureaus already established, as well as those to be established, should be granted an appropriation that will allow the carrying out in full of the stipulations of the conventions. A well-paid and energetic staff with a well-equipped office would insure expeditious work and prompt delivery. The present facilities for rapid transportation would be greatly increased by each international exchange office having the franking privilege, such as is allowed in the United States, and the granting of special concessions by the postal authorities, through the International Postal Union, which could possibly be arranged should every nation become a party to the present conventions.

The international exchanges should be extended to every quarter of the globe, and efforts should be made to bring the powers to realize the necessity of perfecting an institution already established which has for its object the "increase and diffusion of knowledge among men."

I gave a résumé of the contents of the above paper and was asked for some resolution which could be passed by the congress incorporating a suggestion contained in the paper "that the members of the Congress of Archivists and Librarians could do much to further the movement by lending their efforts to arouse the interest of the scientific and literary institutions and societies and governmental authorities in their respective countries, to the end that official action may be taken."

The resolution was presented in English, translated into French, and again translated into English, and appears as follows in the Library Journal:

That the scientific and literary institutions, as well as the governmental authorities of all countries, should unite their efforts to obtain the official provision for international exchanges.—VI. Q. 7. International Exchanges (Paul Brockett, Washington).

Regarding the use of the exchange service by private institutions, M. Langlois, Bibliothécaire-en-chef de l'Institut Catholique, of Paris, having experienced some difficulty in sending packages from France, presented the following resolution:

That the international exchanges should be accorded, liberally and in the interest of all workers, to establishments of private initiative (libraries of free institutions and learned societies), which conform to the general regulations and provide reciprocity.—VII. Q. 7. (M. Langlois, Paris, as amended by M. Grosjean, Bruxelles.)

I had with me a copy of Article VII of the conventions of 1886, in both English and French, which was read:

ART. VII. The bureaus of exchange will serve, in an official capacity, as intermediaries between the learned bodies and literary and scientific societies, etc., of the contracting States for the reception and transmission of their publications.

It remains, however, well understood that, in such case, the duty of the bureaus of exchange will be confined to the free transmission of the works exchanged, and that these bureaus will not in any manner take the initiative to bring about the establishment of such relations.

One more resolution was presented:

That the service of international exchanges should be developed in the most complete manner in the participating countries, and that like organizations should be created in the other States.—VIII. Q. 7. (M. Sury, Bruxelles.)

In connection with attending this congress permission was given me to visit the principal libraries of London, Paris, and Berlin, and observations were made and are contained in a series of notes taken down at the time for reference in the Smithsonian Library. When the libraries were closed, I occupied my time in visiting the museums, taking notes of methods, etc.

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1912



(Publication 2156)

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1912

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT,
FOR THE YEAR ENDING JUNE 30, 1912.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith a report showing the operations of the Smithsonian Institution and its branches during the year ending June 30, 1912, including the work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper, with brief paragraphs relating to the several branches, while the appendix presents detailed reports by those in direct charge of the work. Independently of the present report, the operations of the National Museum and the Bureau of American Ethnology are fully treated of in separate volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board I may here record that Dr. James B. Angell, of Michigan, resigned on January 15, 1912, after an honorable service as Regent for 25 years. The vacancy thus caused was filled by Congress by the appointment of Hon. Charles W. Fairbanks, of Indiana, who as Vice President of the United States had formerly been a Regent from 1904 to 1909. Representatives Scott Ferris and Irvin S. Pepper were appointed Regents to succeed Representatives Howard and Mann. The roll of Regents at the close of the fiscal year was as follows: James S. Sherman, Vice President of the United States, Chancellor; Edward D. White, Chief Justice of the United States; Shelby M. Cullom, Member of the Senate; Henry Cabot Lodge, Member of the Senate; Augustus O. Bacon, Member of the Senate; John Dalzell, Member of the House of Representatives; Scott Ferris, Member of the House of Representatives; Irvin S. Pepper, Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

The annual meeting of the board was held on December 14, 1911, and the usual supplementary meeting on February 8, 1912. The proceedings of these meetings and the annual report of the executive committee are printed in the customary form and the details need not therefore be repeated here.

GENERAL CONSIDERATIONS.

The affairs of the Institution and of its branches have been conducted during the year with success and, I trust, to the satisfaction of all interested. The work covers practically the entire field of natural and physical science, as well as anthropological and archeological researches. The extent of that work is limited only by the amount of the funds available. I referred in my last report to the establishment of a trust fund by Mrs. E. H. Harriman for carrying on certain research work, and I desire here to mention the generosity of several friends of the Institution who have provided means for engaging in certain biological expeditions.

The equipping of the new National Museum building with cases and the installation of the collections progressed satisfactorily. It is anticipated that during the fiscal year 1913 the building will be entirely occupied and all the exhibition halls opened to the public. The great extent of this work may be best understood by the statement that the exhibition halls embrace an area of about 220,000 square feet, or 5 acres. The installation had been so thoroughly planned by Assistant Secretary Rathbun and his associates that the work in

all the departments has advanced in an orderly and systematic fashion.

Although the new Museum building is intended primarily for the exhibition of natural-history specimens, the main floor of the large central hall has been temporarily given up to the exhibition of the collections of paintings belonging to the National Gallery of Art. It is to be noted in this connection that Mr. William T. Evans has presented 137 paintings illustrating the work of 100 American artists. This extremely valuable collection should in due time be housed in a suitable art gallery, with other valuable collections of this character belonging to the Government. The details of the development of the Museum system and accessions made to the collections will be found in the report of the assistant secretary in charge of the Museum.

As I have stated in previous reports, I believe it desirable to establish a number of research associateships similar to the Harriman trust fund, whereby especially capable men in the several branches of science may be afforded opportunities for research work without the care and burden of administrative duties, and with full assurance that as long as their work is properly conducted it will be continued, and that provision will be made for them when incapacitated for active service. The field for scientific investigation is extensive, and there are numbers of worthy projects that can not now be undertaken because of lack of means—projects that could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

In this connection I would call attention to the organization of a Research Corporation in which the Institution is particularly interested.

Research Corporation.—Dr. Frederick G. Cottrell, of the United States Bureau of Mines, having generously offered to present to the Smithsonian Institution a valuable set of patents relating to the electrical precipitation of dust, smoke, and chemical fumes, it seemed to the Regents advisable, for various reasons incident to the business management of the patents, that there be organized a stock corporation which could take title to the patents and in which the Institution should be indirectly represented by the secretary as an individual, and not in his capacity as secretary. The recommendation of the Regents being acceptable to Dr. Cottrell, the Research Corporation of New York was accordingly organized and incorporated by certificate executed February 16, 1912, filed in the office of the secretary of state of New York February 26, 1912, and in the office of the clerk of the county of New York February 27, 1912.

The objects of the Research Corporation are explained in the following circular:

RESEARCH CORPORATION.

The Research Corporation has recently been organized under the laws of the State of New York as a self-supporting means of furthering scientific and technical research. The corporation has two objects: First, to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income; and, second, to apply all profits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors. For these purposes the corporation has been capitalized at \$20,000, divided into 200 shares, but the charter provides that no dividends shall be paid and that the entire net profits shall be devoted to research; all the stock being held under a stockholders' agreement, which recites that the corporation has been organized for the purpose of aiding and encouraging technical and scientific research, and not for personal or individual profit.

At the present time many discoveries are constantly being made, which undoubtedly possess a greater or less potential value, but which are literally being allowed to go to waste for lack of thorough development. This is due, in some cases, to the fact that the inventors are men in the service of the Government, or in the universities or technical schools, who are retarded either by official positions, lack of means, or reluctance to engage in commercial enterprises; and in other cases to the fact that a discovery made incidentally in the laboratory of a manufacturing corporation does not lend itself to the particular purpose of such corporation. True conservation demands that such by-products as these shall be developed and utilized to the fullest extent of which they are capable. The Research Corporation aims to supply this demand; and, through the cooperation of the Smithsonian Institution and the universities, to carry forward the work of investigation already begun by others upon lines which promise important results and to perfect such inventions as may prove to possess commercial value, thus bringing scientific institutions into closer relations with industrial activities and furthering the improvements of industrial processes.

The establishment of the Research Corporation has been rendered immediately possible by the acquisition, through the gift of Dr. F. G. Cottrell, of the United States Bureau of Mines, and his associates, of a valuable set of patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. These devices have already been tested and are in operation in several Western States, and are fully described in an article in "Industrial and Engineering Chemistry", for August, 1911. The ownership of these patents and the exclusive control of them, except in six Western States, at once assures a certain amount of business to the corporation, and it already has contracts for preliminary installations in the Garfield Smelter of the American Smelter & Refining Co., the New York Edison Co., and the Baltimore Copper Refinery. Numerous inquiries have been received from other important plants.

Besides the patents which have already been transferred to the corporation, a number of others in various fields of industry have been offered by officers of the Government and scientific institutions, as well as by manufacturing corporations holding patents not available for their own purposes. A similar offer has also come from Germany, through Mr. Erwin Moller, who has developed certain inventions in the same field as the Cottrell patents, and undoubtedly there are many others who will be glad to have their inventions utilized for the benefit of scientific research.

The management of the corporation is in the hands of a board of directors composed of business and professional men, many of whom have had experience in large industrial and mining enterprises. Among them are Dr. Charles D. Walcott, Secretary of the Smithsonian Institution; Charles Kirchhoff, recently president of the American Society of Mining Engineers; Arthur D. Little, president of the American Chemical Society; Hennen Jennings, of Washington; Gen. T. Coleman du Pont, of Wilmington; James J. Storrow, Charles A. Stone, and Prof. Elihu Thomson, of Boston; Frederick A. Goetze, dean of the faculty of applied science of Columbia University; Elon Huntington Hooker, president of the Development and Funding Co.; Thomas C. Meadows, vice president of the International Agricultural Corporation, and Benjamin B. Lawrence and John B. Pine, of New York. Lloyd N. Scott is the secretary and Linn Bradley the engineer of the corporation.

The Research Corporation invites correspondence with industrial concerns who are interested in perfecting their operations.

All communications should be addressed to "Research Corporation, No. 63 Wall Street, New York City."

The Cottrell patents cover processes used in the precipitation of solid particles from gases and smoke produced in smelters and cement plants. Considerable injury has been suffered by orchards and crops in the neighborhood of the great cement plants in California. The Cottrell processes have met with success in removing the particles of cement from the smoke and gases of such plants and particles of lead and other metals from the smoke of smelters, as well as the abatement of smoke nuisances in general. It is expected by Prof. Cottrell that there will be great economic advantage in saving the solids in the gases and smoke.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithsonian, 1846.....	\$515, 169. 00
Residuary legacy of Smithsonian, 1867.....	26, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Request of James Hamilton, 1875.....	\$1, 000. 00
Accumulated interest on Hamilton fund, 1895.....	1, 000. 00
	<hr/>
	2, 000. 00
Bequest of Simeon Habel, 1880.....	500. 00
Deposit from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins.....	7, 918. 69
	<hr/>
Total amount of fund in the United States Treasury.....	944, 918. 69
Registered and guaranteed bonds of the West Shore R. R. Co. (par value), part of legacy of Thomas G. Hodgkins.....	42, 000. 00
	<hr/>
Total permanent fund.....	986, 918. 69

In addition to the above there are four pieces of real estate bequeathed to the Institution by the late R. S. Avery, some of which yield a nominal rental, and all are free from taxation.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$107,168.31, was derived as follows: Interest on the permanent foundation, \$58,375.12; contributions from various sources for specific purposes, \$21,150; and from other miscellaneous sources, \$27,643.19; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$32,425.66 on July 1, 1911, the total resources for the fiscal year amounted to \$139,593.97. The disbursements, which are given in detail in the annual report of the executive committee, amounted to \$106,533.88, leaving a balance of \$33,060.09 on deposit June 30, 1912, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1912:

International Exchanges.....	\$32, 000
American Ethnology.....	42, 000
Astrophysical Observatory.....	18, 000
National Museum:	
Furniture and fixtures.....	175, 000
Heating and lighting.....	50, 000
Preservation of collections.....	300, 000
Books.....	2, 000
Postage.....	500
Building repairs.....	15, 000
National Zoological Park.....	100, 000
International Catalogue of Scientific Literature.....	7, 500
Total.....	742, 000

EXPLORATIONS AND RESEARCHES.

Scientific explorations and researches have been carried on during the past year at the expense of the Institution as far as its limited income and the generosity of its friends would permit. The National Museum has participated in some of these enterprises by furnishing equipment or supplies or by detailing members of its staff to conduct investigations or to make collections that are subsequently transferred to the Museum. Other researches made through the Astrophysical Observatory and the Bureau of American Ethnology are referred to elsewhere in this report. The resources of the Institution not being sufficient to enable it to plan extensive investiga-

tions in the field or to maintain a corps of collectors, it is compelled to concentrate its efforts on special work of limited scope, but of such a character that the results shall, as far as possible, have an immediate bearing on the progress of science. In recent years, as in the whole of its past history, the Institution has had the aid of public-spirited citizens and the cooperation of other institutions and of the several branches of the United States Government. It has, in turn, cooperated with other organizations in the explorations which they have conducted, being itself benefited thereby and benefiting those with which it has been associated.

In recent years opportunities have been afforded for participating in a number of exploring and hunting expeditions organized by private enterprise, whereby scientific collections of great importance have been obtained. These collections, with those from other sources, are preserved in the National Museum for exhibition to the public or for promoting scientific studies.

The field of these activities of the Institution has been world-wide, but attention has been recently concentrated on Africa and the Panama Canal Zone rather more than on other regions.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of the fiscal year 1911-12, or the spring and summer of 1912, I continued the collecting of Cambrian fossils from the famous fossil locality above Burgess Pass, north of Field, British Columbia, on the main line of the Canadian Pacific Railway, for the first two weeks of July and three weeks in September.

On the way to the Canadian Northwest I stopped off for a few days to examine the locality on Steep Rock Lake, 140 miles west of Port Arthur, where the oldest pre-Cambrian fossiliferous rocks occur. I had made a small collection, when, by the swamping of the canoe in which we were working in the rapids of the Seine River, a short distance from the lake, Dr. J. W. Truman, my guide and fellow geologist, of the Canadian Survey, was drowned, and the work thus most unfortunately brought to a close.

Outfitting at Fitzhugh, on the Grand Trunk Pacific Railway, I went with a well-equipped party over the Yellowhead Pass on the Continental Divide, leaving the line of the railway at Moose River, 17 miles west of the Pass. The Moose River was followed up to its head at Moose Pass, where we passed over into the drainage of the Smoky River, making several camps en route. The final camp was made at Robson Pass, between Berg and Adolphus Lakes. A reconnaissance of the geological section from Moose Pass to the summit of Mount Robson gave approximately 12,000 feet in thickness of the Cambrian formations and 3,000 feet of Lower Ordovician strata. Fossil beds were found at several localities in this section, and one

of them on the east side of Mural Glacier promises to give the finest specimens from the Lower Cambrian rocks of the western side of the continent.

Many photographs were taken both by myself and Mr. R. C. W. Lett, of the Grand Trunk Pacific Railway, who accompanied the party for two weeks.

The scenery about Mount Robson is probably the finest in the Canadian Rockies, as far as now known. The glaciers are on a grand scale, and the geology presents many large problems for solution. My object in visiting the Mount Robson region was to secure data for comparison of the section of Cambrian rocks there with that on the line of the Canadian Pacific Railway, 150 miles to the south.

RAINEY AFRICAN EXPEDITION.

The Smithsonian African expedition, under Col. Roosevelt, had scarcely returned from the field when the Institution received invitations to participate in two others, organized to explore the same general region.

The first was Mr. Paul J. Rainey's hunting trip to British East Africa and southern Abyssinia, where Mr. Rainey especially planned to hunt lions with a pack of American hounds. The natural-history collections that might be secured were offered to the Smithsonian Institution, provided an expert field naturalist be sent to accompany him and prepare such of the game collected as was desired for exhibition or scientific study. Mr. Edmund Heller, who had accompanied the Smithsonian African expedition in such a capacity, was selected and departed with Mr. Rainey in February, 1911. The collection made has been estimated to contain some 4,700 skins of mammals, together with many birds, reptiles, and other animals, making very valuable additions to the present African collection in the Museum. Nearly all of the material is from localities not covered by earlier expeditions, and some of it comes from points never before visited by naturalists. The collection includes the famous series of lions taken by Mr. Rainey with his American hounds, as described in his well-known lectures. There are also many specimens of different kinds of antelopes, including the hartebeests, wildebeestes, and waterbucks, as well as buffaloes, zebras, cheetahs, monkeys, and rodents. A few hippopotamus and rhinoceros skins and one elephant were also collected.

A large number of birds were secured, including some of the rarest species. Many are game birds, among them guinea fowls and francolins (which resemble our partridges), and plantain eaters, crows, bustards, vultures, vulturine guinea fowl, owls, hawks, kites, secretary birds, hornbills, pigeons, parrots, sun birds, flycatchers, etc., are represented. There are also four ostrich eggs.

The party remained in the field nearly a year, having sailed from New York for Mombasa on February 18, 1911, and dispersing about February 15, 1912, at Nairobi.

The territory traversed was mostly to the north and east of that covered by the Smithsonian expedition, and included the country lying between the northern part of British East Africa and southern Abyssinia.

FRICK AFRICAN EXPEDITION.

A further natural-history expedition to Africa was that of Mr. Childs Frick, of New York, whose object was to secure a collection of animals from the territory lying to the north of the regions visited by Col. Roosevelt and Mr. Rainey, covering at the same time certain parts of Abyssinia, northern British East Africa, and the country lying about Lake Rudolf. As naturalist of this party, Dr. Edgar A. Mearns, of the Smithsonian African expedition, was chosen. A portion of the collection of birds is to be donated to the Smithsonian Institution by Mr. Frick, and already several hundred specimens have been received.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

* As mentioned in my last report, the Institution organized in 1910 a biological survey of the Panama Canal Zone, with the cooperation of the Departments of State, Agriculture, Commerce and Labor, and War. At first it was intended to confine the collections to the Canal Zone proper, but as the faunal and floral areas extended to the north and south of this region, it was decided to carry the work into the Republic of Panama, a step which met with the hearty approval of that Republic. The work accomplished has been very valuable to science, including collections and observations of vertebrate animals, land and fresh water mollusks, and plants, including flowering plants, grasses, and ferns.

During the past year the botanists have continued their studies, and collections have been made of fishes, reptiles, and amphibians, birds, and mammals, and special studies and collections have been made of the microscopic plant and animal life of the fresh waters of the zone.

As can readily be imagined, the life areas on the zone will become confused as soon as the canal is opened and the waters of the Pacific and Atlantic watersheds are intermingled. It is particularly important on that account that the present geographical distribution of animals and plants be recorded prior to that time, and this is especially true as regards the life of the fresh waters and the sea-coasts.

Pamphlets have been issued from time to time descriptive of some of the new or specially interesting forms of animals and plants collected by the survey, and as soon as the mass of material has been worked up it is proposed to publish general accounts of all the various collections, and also one or more volumes containing a summary of the whole fauna and flora of the Canal Zone.

As an indication of the biological value of the survey of the zone I may mention that of grasses alone about 150 species were collected, being four to five times as many as were previously known from that region. In the collections of birds and mammals there are likewise many forms new to science.

SIBERIAN EXPEDITION.

Through the liberality of a friend, Mr. Theodore Lyman, of Cambridge, Mass., the Institution has been enabled to participate in a zoological expedition to the Altai Mountain region of the Siberia-Mongolian border, Central Asia, an exceedingly interesting territory, from which the National Museum at present has no collections. A Museum naturalist was detailed to accompany him, the expenses of the expedition being borne by Mr. Lyman, and the natural-history collections obtained to be deposited in the National Museum. Although this expedition had not completed its work at the close of the fiscal year, yet I may here anticipate some of its results by stating that the Museum will probably be enriched by a large number of interesting specimens of birds and mammals.

The scene of the survey and exploration, the Altai Mountain region, is a particularly wild country and quite unsettled, although it is well stocked with game. These mountains are inhabited by the largest of the wild sheep, which, with the ibex, will form the principal big game animals sought by the party, but a general collection of smaller mammals and of birds will also be made.

BORNEO EXPEDITION.

For more than 10 years past Dr. W. L. Abbott, of Philadelphia, has been exploring the Malay Archipelago and has given all his natural-history and ethnological collections to the Smithsonian Institution for the United States National Museum. These collections, so far as the vertebrates are concerned, are the most important ever received by the Museum from any one person. Through illness, Dr. Abbott has been obliged to abandon his exploration, but his interest in the Institution has not abated. He has engaged the services of a collector and placed at the disposal of the Institution funds for continuing the explorations he had begun in Borneo.

The field work will be carried on in eastern Dutch Borneo, the natural history of which is practically unknown. Nothing relating

to it has been published, and there are no collections from this region in the United States, although the National Museum has some from the west and south coasts of Borneo. The Institution is fortunate in having this opportunity to study a country practically unknown to zoologists. It is hoped to secure a quantity of interesting material, including the characteristic mammals of the country, such as oranges, deer, wild pigs, squirrels and smaller rodents, and possibly specimens of the rhinoceros and tapir.

BIOLOGICAL SURVEY IN THE CANADIAN ROCKIES.

Through the courtesy of the Canadian Government and of Dr. A. O. Wheeler, president of the Alpine Club of Canada, the Smithsonian Institution was enabled, in the summer of 1911, to send a small party of naturalists to accompany Dr. Wheeler on his topographical survey of the British Columbia and Alberta boundary line and the Mount Robson region. The party started in June and returned in October, 1911. The expedition was very successful in obtaining a collection covering practically all the birds and mammals inhabiting this previously unworked territory, together with many insects and botanical specimens. The land surveyed included the territory lying about this mountain in the heart of the Canadian Rockies, comprising the most rugged and broken country imaginable. Amid this wonderful scenery Mount Robson rises in titanic outline, the highest peak in Canada, probably between 14,500 and 15,000 feet high, and surrounding it for a distance of 50 miles in all directions lies the field of the survey. In this wild and unclaimed country the party of naturalists remained nearly four months, protected by special permits from the Canadian Government. The collection includes some 900 specimens of birds and mammals, the latter being of all kinds from tiny shrews to caribou and bears. One enormous grizzly bear was obtained by a fortunate shot. Much fine material for exhibition groups was secured, including a series of caribou, mountain goats, mountain sheep, beavers, and many varieties of smaller animals.

ANTHROPOLOGICAL RESEARCHES IN SIBERIA AND MONGOLIA.

Toward the close of the fiscal year arrangements were made in connection with the authorities of the exposition to be held in San Diego, California, in 1915, to carry on some interesting researches bearing on the origin of the American Indians. It was planned that Dr. Hrdlička, of the National Museum, should trace, at least in a preliminary way, the remnants of the stock of people from which in all probability the American race branched off. This is a problem which is becoming one of the most important subjects of research in

American anthropology. He was to visit the upper Yenisei region of Siberia, carrying on his studies and collections for the Museum and the exposition. From upper Yenisei he will go to Irkutsk and such other parts of Mongolia and Turkestan as he may have time to visit. After leaving Siberia he would visit Kiachtata in Chinese Turkestan, Mongolia, and then follow the road to Urga, whence he will proceed along the old caravan route to China proper.

Among the natives of the Yenisei are found physical types that seem in every essential respect to be identical with the American Indian. This type extends from the Yenisei as far as Tibet and it is the plan of Dr. Hrdlička to make a rapid survey of the numerous and little known peoples to be found in these regions, among whom it may be possible to find extensions of the same most interesting physical type which we know exists in the former place. It is his intention to come into close contact with as many of the native tribes as possible, securing photographs and casts of the individuals as well as some material objects.

ANTIQUITY OF MAN IN EUROPE.

A small grant was made to enable Dr. Hrdlička to make some special studies on the antiquity of man in Europe, especially in view of recent discoveries of remains of prehistoric man that seem to indicate great antiquity. The results of his work have not yet been published.

RESEARCHES UNDER THE HODGKINS FUND.

A limited grant has been made from the Hodgkins fund to enable Mr. Anders Knutson Ångström to make certain observations on nocturnal radiation from the earth at Bassour, Algeria, in connection with observations to determine the variability of the sun, which have been in progress there under Mr. Abbot, of the Smithsonian Astrophysical Observatory. The results of Mr. Ångström's researches are awaited with interest.

As mentioned in my last report, the Institution has arranged for the distribution to various parts of the world of standard silver disk pyrheliometers designed by Mr. Abbot, of the Astrophysical Observatory, with a view of securing accurate data and more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

A portion of the income of the fund is devoted to the increase and diffusion of knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man. There was published a few years ago a number of papers on "Expired air," "Organic matter in air," "The air of towns," and other phases of this

general subject. There is now in preparation by Dr. Leonard Hill, associated with Dr. Martin Flack and other investigators of the London Hospital Medical College, a paper discussing the results of experiments to determine the influence of the atmosphere upon our health and comfort in confined and crowded places.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

For the past 19 years the Smithsonian Institution has maintained a table for the use of American biologists at the Naples Zoological Station. This table affords exceptional opportunities for the study of marine life, and it is believed that through its use the cause of biological science has been much advanced.

The appointment of Dr. Sergius Morgulis, a Parker Traveling Fellow from Harvard, which was approved for the months of May, June, and July, was continued until July 22, 1911.

Dr. Ch. Zeleny, of the University of Illinois, who was appointed for one month, including part of June and July, continued his occupancy until July 26, 1911. At the close of the fiscal year no report had been received from Dr. Zeleny in regard to the work accomplished.

Dr. Fernandus Payne, assistant professor of zoology at the Indiana University, carried on researches at Naples during the months of April, May, and June, 1912. His studies included: (a) Selective fertilization, (b) Cleavage factors, and (c) Some pressure experiments. In a brief report on his work, Dr. Payne states that he has (1) completed a paper on "The Chromosomes of *Grylloptalpa borealis*," (2) collected a large amount of material on *Gryllotalpa vulgaris*, and expects to study the question of synapsis, ring formation, chondriosomes, and the sex chromosomes in this form.

When the same period is selected by more than one student the earliest application is considered first, the approval of the later ones becoming necessarily dependent on the ability of the station to provide for more than one Smithsonian appointee at the same time. It should be added that the obliging courtesy shown in this connection to appointees of the Smithsonian Institution by the director of the station often permits appointments to the seat which would otherwise be impracticable.

The prompt and efficient aid of the advisory committee in examining and reporting on applications for the table is, as it has always been, of great service to the Institution and is very gratefully appreciated.

The Institution has renewed the lease of the table for another period of three years.

PUBLICATIONS.

One of the chief agencies of the Institution in promoting "the diffusion of knowledge among men" is the publication and distribution throughout the world of the series of "Smithsonian Contributions to Knowledge," the "Smithsonian Miscellaneous Collections," and the Smithsonian Annual Report. These three series constitute the publications of the Institution proper and, with the exception of the annual report, are printed entirely at the expense of Smithsonian funds. Other publications issued under the direction of the Institution, but at the expense of the Government, include the Proceedings, Bulletin, and Annual Report of the United States National Museum; the Bulletin and Annual Report of the Bureau of American Ethnology; and the Annals of the Astrophysical Observatory.

The "Smithsonian Contributions to Knowledge" is a quarto series begun in 1848, which now comprises 35 volumes of about 600 pages each, including, up to the present time, 148 memoirs. The chief characteristic of these memoirs is that they are discussions of extensive original investigations, constituting important additions to knowledge.

The "Smithsonian Miscellaneous Collections" is an octavo series containing papers of varying length, from two or three pages to an entire volume, being special reports on particular subjects of biological or physical research, classified tabular compilations, tables of natural constants, bibliographies, and other miscellaneous information of value to the scientific worker or student. This series was begun in 1862 and now numbers 60 volumes of about 800 pages each, with an aggregate of several thousand articles.

Limited editions of each memoir in the "Contributions" and of articles in the "Collections" are distributed to specialists in the subjects treated, but the principal distribution of these series during the last 60 years has been to about 1,100 large libraries and institutions of learning in the United States and throughout the world.

The Annual Report of the Board of Regents, known as the Smithsonian Report, is printed under congressional appropriation and in much larger editions than the other series. It is in great measure a popular work, containing, besides the official report on the business operations of the Institution, a general appendix made up of 30 or more original or selected articles bearing on particular advances in human knowledge and discoveries and showing the progress of science in all its branches. It is a publication much sought after.

Smithsonian Contributions to Knowledge.—The Langley Memoir on Mechanical Flight, which had been in preparation for several years, was completed and published in August, 1911. It is a work of 330 pages of text and 101 plates of illustrations. It is the third memoir in volume 27 of the "Contributions," following Secretary

Langley's "Experiments in Aerodynamics," and "The Internal Work of the Wind," published in 1891 and 1893, respectively. The present memoir was in preparation at the time of Mr. Langley's death in 1906, and the part recording experiments from 1887 to 1896 was written by him. The chapters discussing experiments from 1897 to 1903 were written by Mr. Charles M. Manly, who became chief assistant to Mr. Langley in 1898.

In the preface to the Memoir, Mr. Manly says:

The present volume on Mechanical Flight consists, as the title-page indicates, of two parts. The first, dealing with the long and notable series of early experiments with small models, was written almost entirely by Secretary Langley, with the assistance of Mr. E. C. Huffaker and Mr. G. L. Fowler, in 1897. Such chapters as were not complete have been finished by the writer and are easily noted, as they are written in the third person. It has been subjected only to such revision as it would have received had Mr. Langley lived to supervise this publication, and has therefore the highest value as an historical record. The composition of the second part, dealing with the later experiments with the original and also new models and the construction of the larger aerodrome, has necessarily devolved upon me. This is in entire accordance with the plan formed by Mr. Langley when I began to work with him in 1898, but it is to me a matter of sincere regret that the manuscript in its final form has not had the advantage of his criticism and suggestions. If the reader should feel that any of the descriptions or statements in this part of the volume leave something to be desired in fullness of detail, it is hoped that some allowance may be made for the fact that it has been written in the scanty and scattered moments that could be snatched from work in other lines which made heavy demands upon the writer's time and strength. It is believed, however, that sufficient data are given to enable any competent engineer to understand thoroughly even the most complicated phases of the work.

Persons who care only for the accomplished fact may be inclined to underrate the interest and value of this record. But even they may be reminded that but for such patient and unremitting devotion as is here enregistered the now accomplished fact of mechanical flight would still remain the wild unrealized dream which it was for so many centuries.

To such men as Mr. Langley an unsuccessful experiment is not a failure, but a means of instruction, a necessary and often an invaluable stepping stone to the desired end. The trials of the large aerodrome in the autumn of 1903, to which the curiosity of the public and the sensationalism of the newspapers gave a character of finality never desired by Mr. Langley, were to him merely members of a long series of experiments, as much so as any trial of one of the small aerodromes or even of one of the earliest rubber-driven models. Had his health and strength been spared, he would have gone on with his experiments undiscouraged by these accidents in launching and undeterred by criticism and misunderstanding.

Moreover, it is to be borne in mind that Mr. Langley's contribution to the solution of the problem is not to be measured solely by what he himself accomplished, important as that is. He began his investigations at a time when not only the general public but even the most progressive men of science thought of mechanical flight only as a subject for ridicule, and both by his epoch-making investigations in aerodynamics and by his devotion to the subject of flight itself he helped to transform into a field of scientific inquiry what had before been almost entirely in the possession of visionaries.

The original plans for this publication provided for a third part, covering the experimental data obtained in tests of curved surfaces and propellers. Owing to the pressure of other matters on the writer, the preparation of this third part is not yet complete and is reserved for later publication.

Smithsonian Miscellaneous Collections.—In this series there were published during the past year 35 papers forming parts of three volumes and covering a wide range of topics. I may mention the Hamilton lecture by Dr. Simon Flexner on "Infection and Recovery from Infection," three papers by your secretary on Cambrian Geology and Paleontology, several papers descriptive of new genera and species of birds, mammals, and other animals and plants from Smithsonian expeditions in the Panama Canal Zone, Africa, and Canada, as enumerated in the editor's report on another page, and an interesting paper on "The Natives of the Kharga Oasis, Egypt," by Dr. Hrdlička, who discusses the physical measurements and other observations made by him on these people dwelling in an oasis 130 miles west of Luxor, the ancient Thebes. Dr. Hrdlička says:

The type of the Kharga natives is radically distinct from that of the negro. It is, according to all indications, fundamentally the same as that of the non-negroid Valley Egyptians. It is in all probability a composite of closely related northeastern African and southwestern Asiatic, or "hamitic" and "semitic" ethnic elements, and is to be classed with these as part of the southern extension of the Mediterranean subdivision of the white race.

Judging from the mummies of the Oasis inhabitants from the second to fifth centuries A. D., exhumed at El Baguat, the type of the present nonnegroid Kharga natives is substantially the same as that of the population of the Oasis during the first part of the Christian era. The nature of the population of the Oasis in more ancient times can only be determined by skeletal material from the ancient cemeteries.

Smithsonian report.—The annual report for 1910, issued during the past year, contained in the general appendix 34 interesting papers of the usual high character, and of many of them it was necessary to publish extra editions to meet the public demand. The report for 1911 was all in type before the year closed, but unavoidable delays prevented its publication.

Zoological nomenclature.—In continuation of the series of Opinions Rendered by the International Commission on Zoological Nomenclature, there were published two pamphlets containing Opinions 30 to 37 and 38 to 51. The Institution cooperates with this commission by providing clerical assistance for its secretary in Washington and in the publication of its Opinions. In connection with the summary of each opinion there is printed a statement of the case and the discussion thereon by members of the commission. The rules to be followed in submitting cases for opinion¹ as laid down by the commission are as follows:

¹ Cases should be forwarded to the secretary of the commission, Dr. Ch. Wardell Stiles, U. S. Hygienic Laboratory, Washington, D. C.

1. The commission does not undertake to act as a bibliographic or nomenclatural bureau, but rather as an adviser in connection with the more difficult and disputed cases of nomenclature.

2. All cases submitted should be accompanied by (a) a concise statement of the point at issue, (b) the full arguments on both sides in case a disputed point is involved, and (c) complete and exact bibliographic references to every book or article bearing on the point at issue.

The more complete the data when the case is submitted the more promptly can it be acted upon.

3. Of necessity, cases submitted with incomplete bibliographic references can not be studied and must be returned by the commission to the sender.

4. Cases upon which an opinion is desired may be sent to any member of the commission, but—

5. In order that the work of the commission may be confined as much as possible to the more difficult and the disputed cases, it is urged that zoologists study the code and settle for themselves as many cases as possible.

Museum publications.—There were published during the year the annual report of the assistant secretary in charge of the National Museum for 1911, 50 miscellaneous papers of the Proceedings, 3 Bulletins, and 5 parts of Contributions from the National Herbarium.

Ethnological publications.—The Bureau of American Ethnology published the Twenty-seventh Annual Report, containing a paper on "The Omaha Tribe," and Bulletin 47 on the Biloxi and Ofo languages.

Reports of historical and patriotic societies.—In accordance with the national charters of the American Historical Association and the National Society of the Daughters of the American Revolution, annual reports of those organizations were submitted to the Institution and communicated to Congress.

Committee on printing and publication.—The advisory committee on printing and publication under the Smithsonian Institution has continued to examine manuscripts proposed for publication by the branches of the Institution and has considered various questions concerning public printing and binding. Twenty-one meetings of the committee were held during the year and 156 manuscripts were passed upon. The personnel of the committee is as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Mr. C. G. Abbot, Director of the Astrophysical Observatory; Mr. W. I. Adams, disbursing officer of the Smithsonian Institution; Dr. Frank Baker, superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the past fiscal year, aggregating \$72,900, were, as far as practicable,

expended prior to June 30. The allotments for the year ending June 30, 1913, aggregating \$74,900, are as follows:

For the Smithsonian Institution, for printing and binding annual reports of the Board of Regents, with general appendixes.....	\$10,000
For the annual reports of the National Museum, with general appendixes, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	34,000
For the annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding for the bureau....	21,000
For miscellaneous printing and binding:	
International Exchanges	200
International Catalogue of Scientific Literature.....	100
National Zoological Park.....	200
For miscellaneous printing and binding for the Astrophysical Observatory, \$400, and for 1,500 copies of volume 3 of the Annals of the Astrophysical Observatory, \$2,000.....	2,400
For the annual report of the American Historical Association.....	7,000
Total.....	74,900

Distribution of publications.—There was under discussion before committees of Congress at the close of the fiscal year, and later enacted into law, certain proposed measures which particularly affect the practice of the Institution and its branches in the distribution of publications. As finally passed by Congress the law requires that all Government publications must be mailed from the Government Printing Office, mailing lists or labels being forwarded to the Superintendent of Documents for that purpose.

At the Regents' meeting in February last, the secretary called the attention of the board to the proposed legislation and stated that the publications of the Institution are not an incidental result of its work but something planned for and systematically executed. The Institution keeps in touch with all the principal scientific and art establishments of the world, and with experts in science and art who are promoting work in a line with its own, or who are in positions to help in securing collections, information, or advice. The actual labor of wrapping, labeling, and handling the Smithsonian report had been furnished by the Institution and not by the Government, and it was feared that the transfer of the actual work of distribution of the publications of the Institution and its branches to another establishment would distinctly tend to defeat the well-considered plans under which it has been conducted heretofore.

The law as enacted requires the transfer to the Public Printer by October 1 of all publications on hand, and that distribution shall thereafter be made from his office. This measure does not, however, apply to the two series of publications published at the private

expense of the Institution. The question in the main seems to be one affecting the promptness of distribution, which is of primary importance in the case of scientific works, and it is hoped no serious disadvantages may result by the adoption of the new law.

LIBRARY.

The library of the Smithsonian Institution is made up of several constituent parts. The most important of these are the Smithsonian deposit in the Library of Congress and the libraries of the National Museum and Bureau of American Ethnology. There was added to the Smithsonian deposit during the past year a total of 21,863 publications, the equivalent of 14,560 volumes, consisting very largely of works on the various branches of science and art.

To the Museum library there were added 1,791 books, 3,608 pamphlets, and 276 parts of volumes, making the present total in that library about 42,000 volumes, 70,000 unbound papers, besides manuscripts, maps, charts, and other material. Arrangements are being made to divide the Museum library into two principal parts by assembling all books on zoology, paleontology, geology, ethnology, and archeology in the new building.

LANGLEY MEMORIAL TABLET.

A design in plaster for the memorial tablet commemorative of the aeronautical work of the late Secretary Langley was submitted at the December meeting of the Regents by the sculptor, Mr. John Flanagan, and accepted by the committee appointed by the board. The tablet will be cast in bronze and erected in the vestibule of the Smithsonian building. The tablet, which is in relief, measures 4 feet 6 inches high by 2 feet 5 inches wide. It represents Mr. Langley seated on a terrace where he has a clear view of the heavens, and in a meditative mood is observing the flight of birds, while in his mind he sees his aerodrome soaring above them.

The lettering upon the tablet is as follows:

SAMUEL PIERPONT LANGLEY

1834-1906

Secretary of the Smithsonian Institution

1887-1906

Discovered the relations of speed and angle of inclination to the lifting power of surfaces moving in air

"I have brought to a close the portion of the work which seemed to be specially mine, the demonstration of the practicability of mechanical flight.

"The great universal highway overhead is now soon to be opened."—LANGLEY, 1901.

HAMILTON LECTURE

The third Hamilton fund lecture of the Smithsonian Institution was delivered by Dr. Simon Flexner, of the Rockefeller Institute for Medical Research, in the auditorium of the United States National Museum, February 8, 1912.

The title of the lecture was "Infection and Recovery from Infection," an investigation to which Dr. Flexner has given especial study for several years.

In his treatment of this vital and interesting subject the speaker covered a broad field of medical science, and at the same time expressed himself in such a manner as to be intelligible to laymen. Dr. Flexner touched upon the following points:

The part played by bacteria, protozoa, and submicroscopic parasites in causing infection was described, and emphasis laid upon the occurrence on the surface of the body of many kinds of disease-producing germs. The manner in which they are excluded by skin and mucous membranes was discussed, as well as their ability to enter the body by these channels when they were imperfect. In this way a variety of diseases is produced, including diphtheria, meningitis, and probably infantile paralysis. The germs that enter the body encounter a second and even more efficient set of defenses in the blood with its devouring white corpuscles. When disease appears, in spite of and because of inadequacy in the defensive mechanisms, then the body, under the influence of the parasitic germs, sets about creating new defensive principles through the process of immunization. It is immunization that vaccination produces, which is a protection to smallpox; and it is through purposive immunization of animals that the curative serums are prepared, that by injection bringing about an artificial and premature cessation of such diseases as diphtheria and epidemic meningitis. The part played by insects in transmitting malaria, yellow fever, typhus fever, and relapsing fever was sketched, and the varying susceptibilities to disease of different races, species, and individuals dwelt on and in part explained, on the basis of known facts of immunity to and virulence of the germ causes of disease.

The above is the third of the series of Hamilton lectures. In 1871 James Hamilton, a retired lawyer of Carlisle, Pennsylvania, bequeathed \$1,000 to the Smithsonian Institution, the interest of which was to be appropriated biennially by the secretary for some contribution, paper, or lecture on any scientific or useful subject which he might select. As the sum was somewhat limited to adequately carry out the donor's wishes, the interest was allowed to accumulate until the amount was doubled, and the Institution then created a series of lectures, known as the Hamilton Fund Lectures.

The first, by Dr. Andrew D. White, on "The diplomatic service of the United States, with some hints toward its reform," was given in 1905, and the second, by Dr. George E. Hale, on "Some recent contributions to our knowledge of the Sun," was delivered in 1908.

INTERNATIONAL CONGRESSES AND CELEBRATIONS.

The Institution each year receives invitations to numerous scientific congresses and celebrations in the United States and abroad, but as funds are not available for the expenses of delegates few of these invitations can be accepted. In some instances, however, it is possible to arrange for representation by collaborators of the Institution who are visiting the localities on official or private business.

Congress of Americanists.—Dr. Aleš Hrdlička was appointed representative of the Institution and designated as delegate of the United States to the Eighteenth International Congress of Americanists held in London May 27 to June 1, 1912. In addition to Dr. Hrdlička, the State Department also designated Miss Alice Fletcher, Dr. George Grant MacCurdy, Dr. Edgar L. Hewett, Dr. G. B. Gordon, Rev. Charles W. Currier, Prof. Marshall H. Saville, and Dr. Charles Peabody as delegates on the part of the United States at that congress.

The Nineteenth International Congress of Americanists has been invited to meet in Washington in 1914, and Mr. W. H. Holmes, Mr. F. W. Hodge, and Dr. Aleš Hrdlička have been appointed an auxiliary committee to represent the Smithsonian Institution in connection with the preliminary arrangement of details respecting the proposed meeting.

Academy of Natural Sciences of Philadelphia.—The Academy of Natural Sciences of Philadelphia held its centenary anniversary in Philadelphia, March 19, 20, and 21, 1912. At this celebration the Institution and its branches were represented by the secretary, Dr. Charles D. Walcott; Dr. Richard Rathbun, assistant secretary in charge of the United States National Museum; Dr. Frederick W. True, assistant secretary in charge of Library and Exchanges; Mr. Frederick W. Hodge, ethnologist in charge, Bureau of American Ethnology; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum; and Dr. Theodore N. Gill, associate in Zoology, United States National Museum. The secretary also represented the American Philosophical Society on this occasion.

Archeological Congress.—At the request of the Institution, the State Department designated Prof. Arthur L. Frothingham and Prof. George M. Whicher as delegates on the part of the United States to the Third International Archeological Congress at Rome, October 9 to 16, 1912.

Prehistoric Anthropology.—Dr. Alěs Hrdlička, Dr. Charles Peabody, and Dr. George Grant MacCurdy were appointed representatives of the Smithsonian Institution to the Fourteenth International Congress of Prehistoric Anthropology and Archeology at Geneva, September 9 to 15, 1912.

Congress of Orientalists.—Dr. Paul Haupt was appointed representative of the Smithsonian Institution and designated as delegate of the United States at the Fifteenth International Congress of Orientalists, held at Athens, April 7 to 14, 1912. Additional delegates on the part of the United States were Prof. C. Washburn Hopkins, Prof. A. V. W. Jackson, and Prof. Morris Jastrow, jr. (Unforeseen circumstances later prevented Prof. Jackson from attending.)

Congress on Hygiene and Demography.—The Fifteenth International Congress on Hygiene and Demography was invited by the Government, through the State Department, to meet in Washington, September 23 to 28, 1912. I accepted the invitation of the department to serve as a member of the committee on organization. Mr. W. H. Holmes, head curator of anthropology in the National Museum, has been appointed as representative of the Smithsonian Institution on the interdepartmental committee to consider the preparation of exhibits for the congress. At the close of the fiscal year, June 30, 1912, arrangements for the congress were well in hand.

Congress on Applied Chemistry.—In connection with the Eighth International Congress of Applied Chemistry, to be opened in Washington September 4, 1912, and subsequent meetings closing in New York City September 13, Prof. F. W. Clarke has been designated as representative of the Institution, and I have accepted an invitation to attend personally.

Royal Society.—Dr. Arnold Hague, of the United States Geological Survey, was appointed a representative of the Smithsonian Institution at the commemoration of the two hundred and fiftieth anniversary of the foundation of the Royal Society of London, July 16 to 18, 1912.

GEORGE WASHINGTON MEMORIAL BUILDING.

There is now pending in the House of Representatives a bill passed by the Senate, April 15, 1912, granting to the George Washington Memorial Association permission to erect on the Government reservation known as Armory Square, a memorial building to cost not less than \$2,000,000, "where large conventions or in which large public functions can be held, or where the permanent headquarters and records of national organizations can be administered." By the provisions of the bill the control and administration of the building would be vested in the Board of Regents of the Smithsonian Institution, and the association is to provide "a permanent endowment

fund of not less than \$500,000, to be administered by the Board of Regents of the Smithsonian Institution, the income from which shall, as far as necessary, be used for the maintenance of said building."

There is need in Washington of such a structure as here proposed. It would be a fitting memorial to George Washington—the gathering-place and headquarters for patriotic, scientific, medical, and other organizations interested in promoting the welfare of the American people, the development of the country in science, literature, and art.

NATIONAL MUSEUM.

The past year was marked by a new feature in the administration of the National Museum—its opening to the public on Sundays. This measure had long been advocated without effect, and even now the practice must be for a time limited to the new building. Public appreciation was evidenced on the first day of Sunday opening, October 8, 1911, by the presence of 15,467 visitors. The average number of visitors on Sundays up to the close of the year was 1,666, as compared with 693 on week days.

There was added to the permanent collections of the Museum a total of 238,000 specimens and objects, an increase of 10,000 over the year preceding. Of these accessions about 168,000 were biological, 63,000 geological and paleontological, and 7,000 anthropological. A large number of valuable temporary additions in the form of loans were made to the National Gallery of Art, to the collection of art textiles, and to those of the division of history. Among the accessions that I may specially mention are the first aeroplane (Wright) acquired by the Government; important memorials of Gens. Gansevoort and Custer, Rear Admirals Foote and Schley, Commanders Maury and Hosley, and other eminent soldiers and sailors, and mementos of the Washington, Ball, Cropper, McLane, Bradford, and Bailey-Myers-Mason families; some interesting Polish coins dating from 1386 to 1835; and a very large and unique series of postage stamps and other objects relating to the operation of the United States Postal Service. There were also received about 4,000 mammals, besides birds, reptiles, fishes, and invertebrates from the Paul J. Rainey expedition to British East Africa; a large collection of Cambrian fossils; and an unrivaled collection of some 75,000 specimens of fossil echnioderms deposited by Mr. Frank Springer. From the Bureau of Fisheries were received extensive and important collections of fishes from Japan and the Philippines and over 27,000 specimens of marine invertebrates. Other additions of importance are noted by the assistant secretary in his report on another page.

About three-fourths of the exhibition space in the new building has already been made accessible to the public, and before the close

of another year it is expected that the last of the halls will be opened. The installations, however, are to a large extent provisional and much work will still remain to be done to complete their permanent arrangement.

By the transfer of the natural history and anthropological exhibits to the new building, space has become available in the older buildings for the better exhibition of the large collections of the department of arts and industries. The very interesting series of objects commemorative of eminent Americans and of important events in the history of the United States; the collections illustrative of art textiles, graphic arts, and ceramics, as well as firearms, electrical inventions, and other technological material may now receive more attention and be more adequately displayed than has heretofore been practicable.

The picture gallery in the new building, constituting the National Gallery of Art, continues to grow in public interest and importance. A special exhibition of part of the collection of American and oriental art presented to the Nation by Mr. Charles L. Freer was held from April 15 to June 15. The objects displayed included 38 paintings by Whistler, Tryon, and others, 13 Japanese paintings, 36 Chinese paintings, a number of Chinese bronzes, one dating back to 1766-1122 B. C., and examples of Chinese, Persian, and Mesopotamian pottery, ancient Egyptian glass, and Persian and Indo-Persian illuminations. Mr. William T. Evans, of New York, has made 10 important additions to his collection of works of contemporary American painters, now numbering 137 pieces by 98 artists.

A meeting in memory of Mr. Francis D. Millet, lost in the *Titanic* disaster, was held in the auditorium of the new building on the evening of May 10, 1912, under the auspices of The American Federation of Arts, when addresses were made by Senators Root and Lodge, and others. On this occasion I called attention to the valuable services rendered to the Smithsonian Institution by Mr. Millet as chairman of the advisory committee of the National Gallery of Art.

Meetings of a number of scientific organizations were held as usual in the auditorium, including the usual annual April meeting of the National Academy of Sciences, the annual meeting of the American Association for the Advancement of Science, the American Institute of Architects, and the Red Cross conference.

On March 28 and 29 the Washington Academy of Sciences held a conversazione and an exhibition of important recent apparatus, methods, and results pertaining to the scientific investigations carried on by the different Government bureaus and scientific institutions of Washington.

Models and pictures of designs for the memorials to Abraham Lincoln and Commodore Perry were exhibited in several rooms of the new building and attracted much public attention.

The publications issued included the annual report for 1911, numerous papers of the Proceedings, and several Bulletins, which will be enumerated in detail in the usual volume devoted to the operations of the National Museum.

BUREAU OF AMERICAN ETHNOLOGY.

The operations of the Bureau of American Ethnology during the last year are stated in detail on another page by the ethnologist-in-charge of that branch of the Institution's activities. The systematic researches bearing on the history, languages, manners, and customs of the American Indians cover a wide range, and the results of these studies are published as soon as completed. Since the organization of the bureau under the Smithsonian Institution in 1879, 27 annual reports in 32 royal octavo volumes have been issued, and more than 50 bulletins, the collection comprising a most valuable ethnological library. The demand for the "Handbook of American Indians," which is printed in two volumes, has so far exceeded the authorized edition that a measure has been introduced and is now pending in Congress for reprinting it.

The recent field work of the bureau includes:

(1) A visit to El Morro, New Mexico, where impressions of some Spanish inscriptions dating from the year 1606 and having an important bearing on the early history of the Pueblo tribes, were made; (2) excavations in the Jemez Valley in a ruined pueblo on a mesa 1,800 feet high, the ruins bearing evidence of occupancy at two different periods, and containing some interesting pottery, traces of textiles, and other objects; (3) field work to determine the western limit of the ancient Pueblo culture in Arizona; and many other lines of investigation, discussed by Mr. Hodge in an appendix to this report.

The construction of the Panama Canal has aroused so greatly public interest in the aboriginal remains of the West Indies that the bureau has arranged for more extended studies in West Indian archeology. Researches thus far made indicate that the Tainan culture of Porto Rico and the Dominican Republic was represented in the Lesser Antilles by an agricultural people, probably Arawak, who were conquered and absorbed by the marauding Carib. Types of pottery found in some of the Lesser Antilles indicate their occupancy by people superior in culture to the Carib and to those found there at the time of the discovery by Columbus.

INTERNATIONAL EXCHANGES.

There has been an increase of more than 10 per cent in the number of packages handled by the Exchange Service during the past year as compared with the preceding 12 months, the total number being 315,492. These packages weighed over 284 tons.

No change has been made in the amount (\$32,200) granted by Congress during the past four years for the support of this branch of Government work carried on under the direction of the Institution, and the usual sum was collected from various Government and State establishments for services in connection with the transportation of exchanges, the total available resources for meeting the expenses of the system being \$36,591.02.

The publications dispatched by the Exchange Service are classified under four heads: First, the Congressional Record; second, "Parliamentary documents"; third, "Departmental documents"; fourth, "Miscellaneous scientific and literary publications."

The term "Parliamentary documents" as here used refers to publications set aside by law for exchange with foreign Governments, and includes not only copies of documents printed by order of either House of Congress, but copies of each publication issued by any department, bureau, commission, or officer of the Government. The object in sending these publications abroad is to procure for the use of the Congress of the United States a complete series of the publications of other Governments, and the returns are deposited in the Congressional Library.

The term "Departmental documents" embraces all the publications delivered at the Institution by the various Government departments, bureaus, or commissions for distribution to their correspondents abroad, from whom they desire to obtain similar publications in exchange. The publications received in return are deposited in the various departmental libraries.

The "Miscellaneous scientific and literary publications" are received chiefly from learned societies, universities, colleges, scientific institutes, and museums in the United States and transmitted to similar institutions in all parts of the world.

At the request of the Secretary for the Interior of the Union of South Africa the Institution discontinued the sending of full sets of governmental documents to Cape Colony and the Transvaal and partial sets to Natal and the Orange River Colony, substituting one full set for the Government of the Union of South Africa. There are therefore now sent through the Exchange Service to regular foreign depositories only 54 full and 32 partial sets of official documents.

No countries were added during the year to the list of those with which the immediate exchange of official parliamentary journals is carried on, the number of countries taking part in this exchange being 29.

NATIONAL ZOOLOGICAL PARK.

The accessions to the collections in the National Zoological Park during the past year aggregated 510 animals, including 25 species not already represented; 350 of these were obtained by purchase, exchange, or as gifts, and 108 were born and hatched in the park. The total collection on June 30 numbered 1,551 individual animals, representing 381 species of mammals, birds, and reptiles, an increase of 137 over the preceding year. The more important additions were 2 elephant seals and 4 northern fur seals, 8 white pelicans, and a pair each of Brazilian tapirs, Patagonian cavies, and Chilean eagles. The number of visitors was 542,738, or a daily average of 1,487. The largest number in any one month was 95,485, in April, 1912. That the educational value of the park is appreciated is indicated by the fact that it was visited by 4,140 pupils, representing 142 schools and classes from the District of Columbia and neighboring States, and from Vermont, Massachusetts, New York, and Tennessee.

Although each year some improvements are made as regards the accommodation of the collections and the comfort of visitors, yet much remains to be done before the park can be brought to a condition that would properly be expected in a zoological park maintained by this great nation. The most important improvement of the year was the construction of a fireproof building for a central heating plant, in which are installed two pairs of boilers for alternate use as repairs or cleaning become necessary. A yard and bathing pool was also constructed for the use of the hippopotamus and the tapirs; three small inclosures were built for semiaquatic animals; and various other additional structures were built, as enumerated by the superintendent in his report on another page.

I have for several years called attention to the urgent need of a suitable aviary for the fine series of birds in the collection. A suitable structure for this purpose is estimated to cost about \$80,000. Around this large aviary would be grouped the cages for the eagles, vultures, condors, and owls, now scattered irregularly about the grounds.

The superintendent in his report calls attention also to several other desirable measures for the betterment of the park.

The Biological Survey of the Department of Agriculture, in cooperation with the Zoological Park, is carrying on some experiments in breeding mink with a view to ascertaining the possibilities of rearing them in captivity for commercial purposes. The main object in view is to secure data relative to the best methods of rearing mink for their fur, especially as to details of housing, feeding, mating, and caring for them.

ASTROPHYSICAL OBSERVATORY.

The principal research carried on by the Astrophysical Observatory during the year has been on the variability of the sun. Progress has been made in the dissemination of standards of pyrheliometry and on the absorption of radiation by atmospheric water vapor.

The first of these investigations was in continuation of observations taken during several years past to definitely determine the laws governing the apparent variability of the "solar constant." The solving of this problem, it is expected, will be of much value in the probable forecast of climatic conditions from year to year. In this research it seemed important that simultaneous observations be made in widely separated parts of the world. It was accordingly arranged to make such observations at Mount Wilson, California, and at Bassour, Algeria. The results of this work are discussed by Mr. Abbot in his report on another page.

For several years the Institution has been sending to observatories, widely separated throughout the world, standardized copies of the standard silver-disk secondary pyrheliometer designed by the director of the Smithsonian Astrophysical Observatory. During the past year about 10 such instruments have been prepared and sent out, mostly to foreign governmental meteorological services. It is hoped to thus secure not only uniformity of radiation measures, but also a more exact knowledge of solar radiation and the influence of the terrestrial atmosphere upon it.

In carrying forward the research on the absorption of radiation by atmospheric water vapor, there has been recently devised at the observatory a method for determining spectroscopically the total quantity of water vapor between the observer and the sun. Atmospheric water vapor absorption work during the year was confined to the upper infra-red spectrum bands. It is expected by the use of a vacuum bolometer now in preparation to make considerable gain in the sensitiveness of the apparatus and greatly promote the value of the work at great wave lengths.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The cooperative enterprise known as the International Catalogue of Scientific Literature is represented in the United States through the Smithsonian Institution, an appropriation being made each year by Congress to maintain a regional bureau in this country under the auspices of the Secretary of the Institution.

This bureau, in cooperation with thirty-one other regional bureaus, through a central bureau in London, publishes yearly 17 volumes, which form an index to current scientific literature. Each country

supports its own bureau, in the majority of cases by means of direct governmental grants. The London central bureau, which bears all of the expense of editing and publishing the data prepared by the regional bureaus, depends for its support entirely on funds received from the subscribers to the work. In the beginning of the enterprise the subscription price was fixed at \$85 per year for a full set of 17 volumes, and it has been necessary to maintain this price, as there are a limited number of libraries and scientific bodies whose subscription to the work practically assures the sum necessary for publication. The lack of any surplus, however, renders it impossible to reduce the price of the work in order to meet the demands of a large number of scientific investigators, who are practically excluded as personal subscribers to this valuable source of information owing to the present prices.

Had the central bureau a permanent and independent income, derived from an endowment or otherwise, it would be possible to adopt the course which would under similar circumstances be followed by a commercial publishing house having a liberal working capital; that is, to reduce the price of the publication and depend on the certainty of increased sales to pay the relatively small expenses of printing a larger edition of the work. An endowment of \$100,000 properly invested would, it is believed, make it possible to carry out this plan, and, for the end to be accomplished, it would be difficult to find a better use for this comparatively small sum. A more detailed statement of the condition of this interesting example of what may be accomplished through international cooperation will be found in the report of the bureau in the appendix.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

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APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1912:

SUMMARY OF THE YEAR'S PROGRESS.

By the close of the year the natural history departments of the Museum had been quite fully established in the new building, only a small amount of exhibition material remaining to be transferred. The laboratories had been occupied for some time, and the reserve collections brought over from the older buildings had been mainly arranged in the more ample and convenient quarters provided for them. The work of classification had necessarily to be in large part suspended during the period of moving, but the opportunity was availed of to expedite the labeling and recording, and these collections are now, as a whole, in much better condition and far more accessible for reference and study than at any previous time in the history of the Museum. The task of moving was both arduous and delicate, involving, as it did, the handling of several million specimens of all sizes and all degrees of hardness without injury and without the loss or disarrangement of labels. That it was accomplished satisfactorily in such a remarkably short space of time is especially gratifying, in view of the fact that the exigencies of the current work were fully met and no cessation occurred in the receipt of new material.

The installation of the exhibition collections, however, could not be hastened in the same way. A much greater time is required for the construction of the cases, which are more elaborate in character than those intended for storage, and but few of the cases used in the older buildings are adapted to the new building, though many have been temporarily employed. It has also been necessary to reject a large number of the older exhibition specimens as of inferior quality for the purpose, and of those which are being utilized many require to be thoroughly renovated if not entirely done over. The new exhibitions, however, are intended to consist in great measure of fresh materials, much of which has been recently acquired, and to represent

the best skill of the museum preparator and taxidermist. During the year this branch of the work was pressed to the fullest extent possible, and excellent progress was made.

Of the total floor area of about 465,000 square feet furnished by the new building, the amount of space dedicated to the public, including the floors and galleries of the south pavilion and rotunda, is slightly in excess of 220,000 square feet. The permanent exhibitions now planned are limited to the first and second stories of the wings and ranges, which they will completely occupy and which contain about 186,000 square feet. Of this space about three-fourths has been opened to the public, although it should be explained that the installations are still to a large extent provisional and subject to revision, a work that is steadily going on. The end of another year, however, should see all of the exhibition halls opened and in good though not finished condition.

The exhibitions to which the public had gained access by the close of the year comprised, besides the picture gallery in the middle hall, ethnology, historic archeology, systematic and applied geology, mineralogy, paleontology, the birds and fishes, small sections of the mammals and invertebrates, a synoptic series of biology, and certain special zoological collections illustrating anatomy and development, albinism, melanism, hybridism, the domestic animals, and the local fauna. The principal branches that remained to be opened up were the mammals, reptiles, marine invertebrates, and prehistoric archeology.

The removal of the natural history collections from the older buildings furnishes the opportunity for the more complete organization of the department of the arts and industries as contemplated in the original plan of the Board of Regents. Certain subjects belonging to it have for a long time been illustrated to the extent permitted by the crowded condition of the exhibition halls, among them being land and water transportation, firearms, electrical inventions, measuring devices, many kinds of machinery, the graphic arts, and ceramics. There are several others, however, equally important and interesting, of which the Museum has many and valuable illustrations. The material, obtained from various sources, but mainly from the great international expositions, has, from lack of room, been necessarily kept in storage, though before the crowding of the older buildings began some parts of it were exhibited. The space that has been released will afford accommodations for the installation of this material, so far as it has not deteriorated, and for such additions as will be needed to round out the exhibits of the several subjects in at least a modest way. With this accomplished, the Museum will be confronted with the problem of the further develop-

ment of the department to make it comparable with those in the principal European countries, and thus capable of exerting a direct and beneficial influence on the higher industrial pursuits of the country.

It was not until after the middle of the year, however, that the extension of the work in this direction could be taken up, and little more was possible than to remove the material from storage, and begin its unpacking and assorting. The installations will be made at least for the most part, in the old cases, which will have to be more or less remodeled for the purpose, but it is not expected that the public will be long delayed in gaining access to some parts of the collections. The material relating to the graphic arts and to bookbinding will be exhibited in the Smithsonian building, but the other subjects will be mainly provided for in the older Museum building and comprise, besides those above mentioned, mineral technology, textiles, woods, various animal and vegetable products, foods and drugs, etc. The division of history will continue to occupy its present position in the older Museum building, as will the collection of art textiles, but additional space will be required for the former whose growth and popularity have been exceptionally gratifying.

Several unoccupied rooms in the new building were used by the Government for the competitive plans for the Lincoln and Perry memorials, authorized by Congress and submitted during the year. Opened to the inspection of the public, the models and pictures of the designs for the Lincoln monument in Washington were still on exhibition at the close of the year.

The Sunday opening of the Museum, so long and earnestly advocated by the authorities of the Institution, was one of the most noteworthy accomplishments of the year. This innovation is, in fact, to be regarded as marking the beginning of a new period in the history of the Museum, in which its privileges may be enjoyed with equal freedom by all classes. Started on October 8, 1911, and restricted to afternoon hours, it is for the present limited to the new building.

ADDITIONS TO THE COLLECTIONS.

The permanent additions to the collections numbered approximately 238,000 specimens and objects, of which about 168,000 were biological, 63,000 geological and paleontological, and 7,000 anthropological. There were also many loans, some of great value.

The more important accessions in anthropology related to the Indians of southern Alaska and Panama, and included an interesting series of objects from the ruined pueblo of Kwasteyukwa, New Mexico. To the exhibits in mechanical technology were added many important articles, including the first aeroplane acquired and used by the Government, a large number of firearms, both military and sporting, and numerous examples of inventions. The division

American history was especially favored with both gifts and loans, among the distinguished persons and families represented by the memorials received being Gen. Peter Gansevoort, of Revolutionary time, and his son and grandson; Rear Admirals Winfield Scott Schley and Andrew H. Foote, United States Navy; Commanders Matthew Fontaine Maury and Harry H. Hosley, United States Navy; Gen. George A. Custer, United States Army; the Marquis de Lafayette; Prof. George Frederic Barker; Mr. and Mrs. Samuel S. Cox; Julia Ward Howe; the Washington and Ball families; the Cropper and McLane families; the Bradford family, of New England; and the Bailey-Myers-Mason family. The collection of numismatics acquired two valuable series of several hundred pieces each, one representing the Polish coinage from 1386 to 1835, the other consisting of antique copper coins from Asia. Exceptionally important was the transfer to the National Museum of the museum of the Post Office Department, so well known to visitors to Washington, comprising the large and unique series of United States postage stamps, besides many objects relating to the operations of the postal service.

The most conspicuous acquisition by the department of biology consisted of the collection made by Mr. Paul J. Rainey on his expedition to British East Africa, accompanied by Mr. Edmund Heller, which was generously presented. It contains about 4,000 mammals, besides many hundreds of birds, reptiles, fishes, and invertebrates, and has already yielded a large number of new forms. Much material was also received from several other natural history expeditions beyond the United States conducted by the Institution and Museum or under other auspices, the principal regions visited having been the Aleutian Islands, British Columbia and Alberta, the Panama Canal Zone, the Bahama Islands, Peru, Abyssinia and British East Africa, the Altai Mountains on the borders of Siberia and Mongolia, Kashmir, and Borneo. Within the confines of the United States a number of minor explorations were carried on by members of the staff.

The transfers made by the Bureau of Fisheries were extensive and important, consisting mainly of collections that had been studied and described and containing much type material. The fishes were from Japan, the Philippine Islands, and various parts of the United States, while the marine invertebrates, numbering over 27,000 specimens of several groups, represented explorations by the steamer *Albatross* in different parts of the Pacific Ocean. The increases in the division of insects were chiefly from the Bureau of Entomology, and in the herbarium from the Bureau of Plant Industry, though many specimens were secured for the latter by exchange and as the result of field work in New Mexico.

The collections of geology and mineralogy received important additions, including types and recently described materials and many fine examples of building and ornamental stones. The permanent acquisitions in paleontology, amounting to over 60,000 specimens, were mainly of Cambrian fossils from British Columbia and Alberta and from China; Ordovician fossils from the western United States, New York, and Canada; Ordovician and Mississippian fossils from the Mississippi Valley; and Tertiary fossils from the Isthmus of Panama. It is gratifying to note the deposit in the Museum by Mr. Frank Springer of his unrivaled collection of fossil echinoderms, numbering some 75,000 specimens, which he has been many years in assembling and on which no expense has been spared. The material has been installed and made accessible in one of the larger laboratory rooms, and it is the purpose of Mr. Springer to devote much of his time to further research work in connection with it.

NATIONAL GALLERY OF ART.

A memorable event in the brief history of the Gallery was the exhibition in one of the great halls of the new building of a selection of objects from the collection of American and oriental art presented to the Nation in 1906 by Mr. Charles L. Freer, of Detroit, Michigan, but which is to remain in the possession of the donor during his life. This special exhibition, which continued during two months, from April 15 to June 15, and opened with an evening reception, was made possible through the courtesy and generosity of Mr. Freer, to whom the expenses of transportation were defrayed.

The selection, which numbered 175 pieces out of the more than 4,000 composing the Freer collection, was representative of its characteristic features, and in variety, richness, and rarity of material constituted in itself a remarkable exhibit for any place or time. The American art side of the collection was illustrated by 38 paintings, of which 24 were by James McNeill Whistler and the others by Thomas W. Dewing, Dwight W. Tryon, Abbott H. Thayer, and Winslow Homer. Of oriental productions there were 13 Japanese paintings of the sixteenth to the nineteenth centuries; 36 Chinese paintings, the earliest belonging to the Liang dynasty, and also albums of Chinese paintings; 17 Chinese bronzes, one dating back to the Shang dynasty, many centuries before the Christian era; Chinese sculptures of the Wei and T'ang dynasties; 52 examples of old Chinese, Korean, Japanese, Persian, and Mesopotamian pottery; 7 specimens of ancient Egyptian glass; and 4 Persian and Indian Persian illuminations.

Mr. William T. Evans, of New York, whose generous benefactions have extended through more than five years, made 10 important additions to his collection of the works of contemporary American

painters, which, at the end of the year, numbered 137 pieces by 98 artists. One of the older paintings was also exchanged for another and better example of the work of the same artist. This collection, which occupies the greater part of the space now allotted to the Gallery, is a most notable presentation of American art. The painters represented in the contributions of the year are William B. P. Closson, Wyatt Eaton, Albert L. Groll, Arthur T. Hill, William M. Hunt, William S. Robinson, Abbott H. Thayer, Elihu Vedder, Edgar M. Ward, Frederick J. Waugh, and Irving R. Wiles. Mr. Evans also added 34 proofs of American wood engravings to his previous donation of 81 examples.

The collection of historical paintings in oil was increased by two noteworthy gifts to the Nation. One of these consisted of portraits of Mathias Ringmann, Martin Waldseemuller, and Vautrin Lud, the geographers who, in 1507, first applied the name "America" to the new continent, and was received from the municipality of St. Dié-des-Vosges, France. The other comprised a portrait of John Ericsson and a painting illustrating the "Combat between the *Monitor* and the *Merrimac*," and was made by the Swedish American Republican League of Illinois. The Gallery was also fortunate in obtaining many loans, both of paintings and sculpture, and within the restricted limits of its quarters has maintained an exhibition of exceptional merit and attractiveness.

ART TEXTILES.

Interest in the collection of art textiles, under the patronage and direction of Mrs. J. W. Pinchot, continued unabated, and of 68 additions received 15 were gifts. The laces have now become sufficiently well represented to permit the arrangement of a synoptical series in which all of the varieties are shown, and of a special exhibit constituting a résumé of the history of lace making.

PERIOD COSTUMES.

During the year a collection of costumes intended to illustrate the changes in style of personal attire in America from the colonial period to the present time, was undertaken. The material so far gathered has consisted mainly of apparel actually worn at important state and social functions, which gives it an historical interest, and the collection should also very materially supplement that of art textiles, offering useful suggestion in the field of design. The subject was taken up on the initiative of Mrs. Julian James, who is giving it her personal attention, and the contributions, ranging from single objects to complete parts of costumes, comprised both loans and gifts.

MISCELLANEOUS.

Of duplicates separated from the collections in the course of the work of classification about 8,000 specimens, chiefly minerals, or fossils, and recent animals, were distributed to schools and colleges for teaching purposes. About 16,000 duplicates were also used in making exchanges, whereby material of similar value was obtained for addition to the permanent collections. To specialists connected with other scientific establishments some 11,500 specimens, mainly biological, were sent for study, principally in the interest of the Museum and for the purpose of securing the identification of material which could not be determined here.

The number of persons who visited the new building during the year was 281,887, the older Museum building, 172,182, and the Smithsonian building, 143,134, being equivalent to an average daily attendance at each of the three buildings of 800, 550, and 457, respectively. The total Sunday attendance at the new building, beginning October 8, amounted to 64,987, an average by Sundays of 1,666 persons, more than double the daily average for the same building.

The publications issued during the year comprised the annual report for 1911, volumes 39, 40, and 41 of the Proceedings, and Bulletins, besides 59 papers from the Proceedings, Bulletins, and Contributions from the National Herbarium, printed separately. The total number of copies of publications distributed was about 67,000.

The library received additions to the extent of 1,791 books, 3,600 pamphlets, and 276 parts of volumes, and at the end of the year was estimated to contain a total of 42,002 books and 69,670 unbound papers. With the completion of the arrangements in progress all the works on natural history will be transferred to the new building, leaving the older quarters for those relating to the arts and industries and history, and by this division the congested condition of the library which has so long prevailed will be relieved.

The facilities offered by the new building were often availed of during the year for congresses and meetings relating to science and art. Among the more important bodies which met or were received there were the American Association for the Advancement of Science and affiliated societies, the National Academy of Sciences, the American Federation of Arts, the American Institute of Architects, and the Red Cross Conference.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary in Charge U. S. National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

OCTOBER 31, 1912.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to submit the following report of the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1912, conducted in accordance with the act of Congress approved March 4, 1911, making appropriations for sundry civil expenses of the Government, which act contains the following item:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archaeological remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, forty-two thousand dollars.

SYSTEMATIC RESEARCHES.

The systematic researches of the bureau were conducted by the regular staff, consisting of eight ethnologists, and with the aid of specialists not directly connected with the bureau, but the results of whose studies were procured for publication. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, was occupied with administrative affairs during the greater part of the year, but from time to time, as opportunity afforded, he was engaged in the preparation of an annotated Bibliography of the Pueblo Indians, with the result that almost 1,100 cards bearing titles, descriptions of contents, etc., of writings pertaining to the Pueblos were completed. Knowledge of the Pueblo Indians commenced with the year 1539, and these people have been the subject of so much attention by early Spanish explorers and missionaries, as well as by ethnologists and others, in recent years, that the literature has become voluminous and widely scattered. The need of a guide to this array of material has been greatly felt by students, and for this reason Mr. Hodge has prepared notes on the subject for a number of years with the view of their final elaboration in the form of a bibliography.

Late in August Mr. Hodge proceeded to New Mexico, and after a brief visit to the archeological sites in the Rito de Los Frijoles, northwest of Santa Fé, where excavations were conducted in conjunction with the School of American Archaeology in 1911, continued

to El Morro, or Inscription Rock, about 35 miles east of Zuñi, for the purpose of making facsimile reproductions, or squeezes, of the Spanish inscriptions there, which have such an important bearing on the early history of the Pueblo tribes. El Morro is a picturesque eminence of sandstone rising from the sandy valley, and by reason of the former existence of a spring at its base, which is now merely a seep, it became an important camping place of the early Spaniards on their journeys to and from the Rio Grande and the Zuñi and Hopi pueblos. The inscriptions of these early explorers were carved near the base of the rock, chiefly on the northern and southern sides of the highest portion of the mesa, and in the main consist of the names of the visitors with the dates of their visits, but in a number of cases elaborated with a more or less full statement of the object of the journey.

The earliest of the inscriptions is that of Juan de Oñate, the colonizer of New Mexico and founder of the city of Santa Fé, who inscribed his name and the object of his visit in 1606, on his return from a perilous journey to the Gulf of California. Others who visited the rock and left a record are, in order of date: Gov. Francisco Manuel de Silva Nieto, who escorted the first missionaries to Zuñi in 1629; Juan Gonzales, probably a member of the small military escort accompanying the same party, and bearing the same date (1629); Lujan, who visited Zuñi in 1632 to avenge the murder of Fray Francisco Letrado, one of the missionaries who accompanied Silva Nieto; Juan de Archuleta, Diego Martin Barba, and Agustin de Ynojos, 1636; Gov. Diego de Vargas, 1692, the conquerer of the Pueblos after their rebellion in 1680 which led to their independence of Spanish authority during the succeeding 12 years; Juan de Uribarri, 1701; Ramon Paez Hurtado, 1709; Ju. Garcia de la Rivas, Feliz Martinez, and Fray Antonio Camargo, 1716; Joseph de Payba Basconzelos, 1726; Juan Paez Hurtado and Joseph Truxillo, 1736; Martin de Elizacochea (bishop of Durango) and Juan Ignacio de Arrasain, 1737; and others of the eighteenth century. These inscriptions were all carefully photographed by Mr. Jesse L. Nusbaum with whose aid Mr. Hodge made paper squeezes which were brought to Washington and transferred to the National Museum, where Mr. Nusbaum later made plaster casts of the paper negatives, insuring the permanent preservation of the inscriptions in this manner. This work was accomplished none too soon, since deterioration by weathering is progressing in some parts of the cliff face bearing the inscriptions, while vandalism is perhaps playing an even more serious part in the destruction of these important historical records, notwithstanding the fact that El Morro has been created a national monument by Executive order.

Early in September Mr. Hodge joined Dr. Edgar L. Hewett, director of the School of American Archaeology, and his assistants, in the Jemez Valley, about 65 miles northwest of Albuquerque, for the purpose of conducting excavations, under the joint auspices of the bureau and the school, in an extensive ruined pueblo on a mesa 1,800 feet in height, skirting the valley on the west. This village was occupied within the historical period by the Jemez people, by whom it is known as Kwasteyukwa. The ruins cover an area approximately 850 by 600 feet, and even on partial excavation exhibited distinct evidence of occupancy at two different periods. The original pueblo was considerably larger than the one later inhabited, although the latter was built on the ruins of the older and of the same materials. The walls were of tufa blocks, rudely shaped and set in adobe mortar; the rooms were small, the masonry crude, and practically none of the walls remain standing above ground. A large artificial reservoir in a northwestern angle of the ruin furnished the water supply, and various smaller depressions probably mark the sites of kivas. The later inhabitants—those within the historical period, or about the first half of the seventeenth century—buried their dead in and beneath the débris of the older part of the pueblo. The mortuary accompaniments were of the usual character, speaking in general terms—pottery, traces of textiles, stone and bone implements and other objects, and a few ornaments. The finding of glass beads with the remains of a child, and an iron nail in another grave, bear testimony of the comparatively recent occupancy of the village by the Jemez Indians. It was the custom of the inhabitants to throw large stones into the graves, resulting in the breaking of almost all the pottery deposited with the dead. The fragments were carefully preserved, however, and will be repaired by the National Museum. A noteworthy specimen of pottery bears in its decoration a feather design almost identical with feather symbols found on ancient pottery of the Hopi, and therefore tending to verify traditions of the latter people that some of their ancestral clans came from the Jemez.

Dr. J. Walter Fewkes, ethnologist, was engaged in field work from July to October, having especially in view the determination of the western limits of the ancient Pueblo culture in Arizona. Outfitting at Jerome, in that State, he proceeded to certain large ruins on the upper Verde, on Oak Creek, and in Sycamore Canyon, where some time was spent at each locality in photographing and in making plans of these and adjacent remains, as well as in a study of the formerly occupied caves near the mouth of Oak Creek. Crossing the rough country separating the upper course of Oak Creek and the great sandstone cliffs known as the Red Rocks, Dr. Fewkes revisited and further studied the large cliff dwellings, known as Honanki and

Palatki, excavated by him in 1895. Several hitherto undescribed ruins were added to the list of ancient remains in this general vicinity.

From the Red Rocks Dr. Fewkes returned to the Verde and followed that stream upward to the Jordan ranch, where cliff houses of an instructive character were photographed and studied. He also investigated on the hills back of Cornville certain large stone structures of the type known to Spanish-speaking people as *trincheras*, rude but massive fortifications that here begin to assume importance. A number of ruins hitherto unrecorded belonging to the cave- or cliff-dwelling type were observed in the walls of Sycamore Canyon, or Dragoon Fork, and the outlines of stone houses were seen above the river terrace near the junction of Sycamore Creek and Verde River. A large aboriginal fort, with walls well preserved, was found on a height overlooking the Verde, above the mouth of Granite Creek, and others more nearly destroyed were seen at the Baker ranch and in Hell Canyon, not far from Del Rio Station. Near the Baker ranch, a mile or two down the Verde, are the remains of a cliff dwelling, directly in the line of a projected railroad, which will probably be destroyed when the road is constructed. Dr. Fewkes also visited the ruins of several fragile-walled habitations, consisting of low mounds, near Jerome Junction and Del Rio. Although many evidences of such ancient dwellings are here seen, most of the foundation walls have been carried away by settlers and used in their own house building.

A large fort, with well-preserved walls, occupies a low limestone ridge east of Williamson Valley, above the trail from Del Rio westward, and commanding a view of the valley west of Jerome. This fort is typical of the *trincheras* that appear more and more frequently as one proceeds westward from the upper Verde. Several inconspicuous ruins, hitherto undescribed, were found in Williamson Valley, those situated on the hills belonging to the fortification type, while those in the valleys consist merely of low mounds of stone and other débris.

Proceeding westward from Chino Valley, many interesting ruins were observed along the valley of Walnut Creek, referred to in Lieut. A. W. Whipple's report of 1853 as Pueblo Valley, once noted as the site of old Camp Hualapai. This vale, from Aztec Pass to the point where the creek is lost in the sands of Williamson Valley, was extensively tilled in prehistoric times, as is attested by the well-marked remains of ancient irrigation ditches. Characteristic petroglyphs were also found in Walnut Valley.

As elsewhere in this region, two types of ruins were observed in Walnut Valley, namely, (1) extensive stone fortifications with massive walls crowning the hilltops on both sides of the valley and commanding a wide view, and (2), on the low terraces bordering the stream, clusters of small mounds constituting the remains of farm-

houses, upright posts supporting walls of wattling plastered with mud like the *jacales* of the Mexicans and evidently identical in their general character with the dwellings of certain Yuman tribes. Among the best preserved of the forts, called "pueblos" by Whipple, are those near Aztec Pass and at Drew's ranch, Shook's ranch, and Peter Marx's ranch, while others are found farther down Walnut Creek. No trace of terraced pueblo dwellings were seen in this region.

In order to shed further light on the relations of the two types of ruins described, Dr. Fewkes made an examination of the ancient remains along the Agua Fria and near Prescott. At both places the ruins were found to be of the same dual character. In a few instances, as at Frog Tanks, near the mouth of the Agua Fria, the ruins suggest the great houses or compounds of the Salt and Gila Valleys, but here also *trincheras* and fragile-walled houses are the more common.

The observations made by Dr. Fewkes during this field season indicate that the ruins in the region referred to are the remains of buildings so different in architecture from that of true pueblos that it is probable the culture of their occupants was also different. Dr. Fewkes reached the conclusion that the ruins of the forts and small dwellings referred to were constructed and used by a Yuman people whose descendants, more or less mixed with Apache and other non-related tribes, are represented to-day by the Hualapai, Yavapai, and Havasupai Indians. Although the *jacal* domiciles of western Arizona were probably structurally similar to certain ancient houses in the Pueblo region of New Mexico, the river-terrace houses of Walnut Valley were more like certain habitations of the lower Gila River than they were the pueblos of the Rio Grande.

On returning to Washington Dr. Fewkes prepared a report on his observations in this interesting archeological field, which, with suitable illustrations, is now in press as one of the accompanying papers of the twenty-eighth annual report.

Dr. Fewkes also gave considerable time to reading the proofs and arranging the illustrations of his memoir on Casa Grande, which likewise is to appear in the twenty-eighth annual report.

On the completion of the above work Dr. Fewkes commenced the preparation of another paper, relating to "Designs on Prehistoric Hopi Pottery," a subject to which he devoted much attention in connection with his studies of the Hopi Indians for 20 years. This memoir, which was well advanced toward completion at the close of the fiscal year, accompanied by numerous plates and text figures, is designed as a key to the interpretation of the decoration of ancient Hopi earthenware. The great multiplicity of life designs appearing on the pottery of ancient Sikyatki are treated in the paper, in which

modifications in decorative devices derived from feathers, birds, and other animals, and conventional figures are likewise discussed. One object of Dr. Fewkes's treatise is to meet a growing desire of those interested in primitive symbolism, and another is to define the peculiarities of one ceramic area of the Pueblos as a basis for comparison with others, thus facilitating the study of Pueblo culture origins and prehistoric migration routes.

As the construction of the Panama Canal has tended to stimulate an interest in aboriginal remains in the West Indies, and as many archeological specimens differing from those of the Antilles previously known are now being brought to light, the time for a scientific study of them, as well as of the aboriginal sites of the West Indies, has arrived. Much of the interest recently manifested in early Indian life in the West Indies may be ascribed to Dr. Fewkes's memoir on "The Aborigines of Porto Rico and Neighboring Islands," which appears in the twenty-fifth annual report. Since the publication of this paper the new material has become so abundant that plans have been made for Dr. Fewkes to resume his study of West Indian archeology. The most noteworthy collection of aboriginal objects from this area made in recent years is that of George G. Heye, Esq., New York, who courteously has placed his material at the disposal of the bureau as an aid to these investigations. This collection has been studied by Dr. Fewkes and the most important objects contained therein are now being drawn for illustrative purposes.

Dr. Fewkes's researches thus far indicate that the so-called Taino culture of Porto Rico and San Domingo was represented in the Lesser Antilles by an agricultural people, probably Arawak, who were conquered and absorbed by the marauding Carib. Study of the collections above noted tend to show that several of the Lesser Antilles were marked by characteristic types of pottery, indicating their occupancy by a people superior in culture to the Carib and those found there at the time of the discovery by Columbus. New light has been shed on the relations of these early Antillean people and the Orinoco tribes, which, although generally called Carib, were probably an antecedent people of higher culture.

Mr. James Mooney, ethnologist, spent the first three months of the fiscal year in continuing investigations among the East Cherokee in western North Carolina, and in locating and investigating mixed blood remnant bands in the eastern part of that State. The Cherokee work consisted chiefly of a continuation and extension of the study of the aboriginal sacred formulas of the priests and doctors of the tribes, with the accompanying ceremonies and prescriptions. Although the former dances and tribal gatherings have fallen into disuse, the family rites and medical ceremonies still hold sway among the full bloods.

The so-called "Croatan Indians" of southeastern North Carolina were found to be an important and prosperous community, numbering about 8,000, evidently of Indian stock with admixture of negro and white blood, and closely resembling the Pamunkey Indian remnant tribe in Virginia, but with no survival of Indian language or custom and with almost no knowledge of their own history. After years of effort they have secured definite State recognition as an Indian people. There is no foundation in fact for the name "Croatan Indians," which they themselves now repudiate, and in all probability they represent the mixed-blood descendants of the aboriginal tribes of the region which they now occupy. The existence was also established, and the location ascertained, of several smaller bands of similar mixed-blood stock, but without official recognition, in the eastern section of the two Carolinas.

The remainder of the year was devoted by Mr. Mooney to the compilation of material in connection with his pending study of Indian population. By reason of the shifting, disintegration, and new combinations of tribes, no one section can be treated separately or finally as apart from others. Considering the difficulties met in a study of this kind, the work is making satisfactory progress.

Dr. John R. Swanton, ethnologist, devoted most of the year to field researches among the Creek Indians in Oklahoma. These investigations continued from the middle of September, 1911, to the middle of May, 1912, during which period excursions were made into Texas to visit the Alibamu Indians and for the purpose of endeavoring to trace remnants of other Texas tribes, and to the Caddo Indians of southwestern Oklahoma. No remains of Texas tribes, of ethnologic value, other than the Alibamu, were located, but a considerable mass of material was obtained from the latter. Dr. Swanton's visit to the Caddo was with the view of learning how many of the old Caddo dialects were still spoken, and some valuable documentary material was obtained in Natchitoches, Louisiana. No words of Haiish, supposed to be quite distinct from the other Caddo dialects, could be gathered, but evidence was obtained that it resembled Adai. In the course of his Creek investigations Dr. Swanton visited and made photographs of every busk ground of the Creeks and Seminole still maintained, and information was gathered regarding the organization of the "big house" in each, as well as in those that have been abandoned. Dr. Swanton devoted July and August, 1911, mainly to the study of the Hitchiti and Natchez languages, and the period subsequent to his return to Washington in May, 1912, was occupied in copying his field notes and in incidental work on the Timucua language of ancient Florida, as preserved in Father Pareja's writings, with the view of determining whether Timucua bears any relation to the languages of the Muskogean stock.

On his way from Oklahoma to Washington, Dr. Swanton stopped at Bloomington, Indiana, for the purpose of representing the bureau at the fifth annual meeting of the Mississippi Valley Historical Association, before which he read a paper on "De Soto's line of march, from the point of view of an ethnologist."

Mrs. M. C. Stevenson, ethnologist, continued her field researches of the Tewa tribes of New Mexico throughout the fiscal year, devoting attention particularly to those of San Ildefonso and Santa Clara, and incidentally to the Tewa of Nambe and San Juan. The pueblo of Pojoaque is now practically extinct as an Indian settlement, only about six Tewa remaining in that village. Special attention was devoted to the religious, political, and social organizations of these peoples, which, owing to their extreme conservatism, are difficult to determine. The Tewa are divided not only into clans with patrilineal descent, but each tribe consists of a Sun people and an Ice people, each with its own kiva, or ceremonial chamber. At San Ildefonso the kiva for the Sun people is known as Po'tée, "Squash kiva," and that of the Ice people is Kun'iyä'tée, "Turquoise kiva." The element *tée* signifies "round," hence indicating that originally the Tewa kivas were circular. A third kiva of San Ildefonso is called Téepoa'te, meaning "Round gathering or sitting place," and symbolizes a lake. Although from its trim condition this kiva appears to be modern, it is in reality very old, and within the memory of the older men of San Ildefonso it was used whenever the Sun and Ice people met together, because of its large size. Large councils are still held in the Téepoa'te, and it is used also as a dressing room for the dancers participating in ceremonies. The kivas are also the meeting places of the sacred fraternities. The Squash, Summer Bear, and Fire organizations of San Ildefonso hold their ceremonies in the kiva of the Sun people. The Fire fraternity was adopted in the ancient past from a people in the north who lived in skin tipis, wore clothing of dressed deerskin, and spoke a strange tongue. This fraternity finally became extinct, and, wishing to reestablish it, the San Ildefonso people sent four men to the Sun people of Zuñi (whose Fire fraternity, according to tradition, had a similar origin), who initiated them into their order, thus enabling them to revive the fraternity at San Ildefonso. The Galaxy and Turquoise fraternities meet in the Turquoise kiva. The members of the former organization have a fraternity chamber adjoining this kiva, and at the great Buffalo festival its members frequent the chamber as well as the kiva.

Each fraternity at San Ildefonso has a tablet altar, which is erected on the western side of the kiva, while the participants in the ceremonies sit facing eastward. These people have interesting animal fetishes and many human images of stone representing their anthropic gods. They appeal to their zoic deities to heal diseases inflicted by

sorcery, and all ceremonies connected with these supplications are dramatic in character. Anthropomorphic gods, principally ancestral, are invoked for rain and the fructification of the earth. The present priest of the Sun people is director of the Summer Bear fraternity, and he is also the keeper of the calendar. He must observe the daily rising and setting of the sun and must watch the rising and setting of the moon. Elaborate solstice ceremonies are performed. Those for the summer solstice are held in the kiva of the Sun people. The Ice people join the Sun people in the summer ceremonies, and the Sun people join the Ice people in the ceremonies of winter. In each kiva the two rain priests sit side by side, the priest of the Ice people always at the right of the priest of the Sun people, while officers associated with each priest sit in line with him. The prayers of the priest of the Sun people are for the purpose of bringing rain, and in order that they may be answered he must live an exemplary life. The same beliefs control the functions of the priest of the Ice people, who, through the ceremonies which he directs, is expected to induce cold rains and snow that the earth may not become hot and destroy the vegetation. All male children are initiated, either voluntarily or involuntarily, into the kiva of the Sun or of the Ice people. When a husband and his wife belong to different sides, the kiva to which the child shall belong is selected by mutual agreement, and a representative of that kiva is chosen as his ceremonial father immediately after the birth of the child. From birth to death the lives of the Tewa are almost a continuous ceremony. The ceremonial father ties native cotton yarn around the wrists and ankles of the new-born child, that its life may be made complete. The initiation ceremonies of the young men are very elaborate, and many miles are traveled on foot to the summit of a high mountain where the final ceremonies are performed. Although the Tewa are professed Christians, they adhere tenaciously to their native religion and rituals; and while the church performs marriage and burial services, the Indians still cling to their native marriage feasts and mortuary ceremonies.

The cosmogony of the Tewa is elaborate and complicated and bears closer resemblance to that of the Taos Indians than to that of the Zuñi. The original sun and moon are believed always to have existed, but the present sun and moon were born of woman after the world and all the people were destroyed by a great flood. The myth associated with the creation of these deities and with their exploits is of great interest.

The masks of the anthropomorphic gods are never seen outside of the kivas of San Ildefonso. There is a great variety of these masks, many of them similar to those of the Zuñi. They are held in great secrecy.

Rattlesnakes, sacred to the fraternities, are captured when young and are reared in rooms adjoining the kivas. A fluffy eagle feather is attached to the head of the snake when caught, and the snake is held captive with a string sufficiently long to allow it considerable freedom until it becomes accustomed to its new surroundings, where the string is removed. Small openings in the chamber allow the snakes to pass in and out. In one ceremony, which takes place at daylight, the snakes are handled outdoors, but on such occasions the pueblo is so patrolled that spying by outsiders is impossible, although the Mexicans live almost in the heart of the village. The Santa Clara people likewise make use of live snakes in certain ceremonies, and they also have a large owl which they keep secreted as carefully as the snakes.

The government of the Tewa differs somewhat from that of the Zuñi. While the governor of the Zuñi has to do with civic matters only, a Tewa governor has absolute power over all matters concerning his tribe except those controlled exclusively by the rain priests and the war priests. Mrs. Stevenson's studies of the natal rites of the Tewa indicate that they are more like those of the Sia than of the Zuñi, while the religious ceremonies connected therewith more closely resemble those observed by the Taos people. The child is baptized in accordance with aboriginal customs before the baptismal rite of the church is performed. At the present time the infant is usually carried in the arms instead of on the back of the mother, but there is a small, flat cradle, with top, and headrest with turquoise setting, made as it was centuries ago.

The material culture of the Tewa is in many respects similar to that of the Zuñi. They were adept in the textile art in early days when cotton, milkweed, yucca, and the hair of native animals were employed in weaving, but this industry became lost after the introduction of sheep by the Spaniards, for the Tewa, like the Taos people, came to depend upon the Zuñi and Hopi traders for woven garments, and also for textile paraphernalia for use in ceremonies. One or two Tewa have revived the weaving industry to some extent. A San Ildefonso man learned the process from Santo Domingo, and a man of Santa Clara acquired it from the Navaho. The dainty basket moccasins are now seldom seen, but the women still wear moccasins with heavy leg wrappings during ceremonies, while at other times a well-dressed sheepskin boot tied below the knee is worn, for deer skin has become rare. Native beads are now very seldom seen. Mrs. Stevenson's study of Tewa ceramics has convinced her that those who decorate their pottery apply their designs, especially the conventional patterns, with little understanding of their symbolism, the significance of which has become extinct. When questioned the potters always have a ready answer; hence students are often deceived. W

the exception of the black ware of Santa Clara, the pottery of the Tewa has greatly deteriorated.

Mrs. Stevenson has been enabled to record the names of the sacred mountains of the Tewa people, as well as the myths associated with them. In their general beliefs and customs the Tewa are found to be intermediate between the Taos and the Zuni.

The beginning of the fiscal year found Dr. Truman Michelson, ethnologist, engaged in an investigation among the Fox Indians near Tama, Iowa, with whom he remained until the middle of August, when he proceeded to Oklahoma, where he initiated researches among the Sauk Indians of that State. Dr. Michelson was very successful in recording the myths and tales of the Foxes, which covered about 2,300 pages of texts. He obtained likewise some notes on the ceremonial and social organization of that tribe, but these are neither full nor complete, as the Foxes are, without exception, the most conservative of the Algonquian tribes within the United States. While among the Sauk Dr. Michelson, with the aid of a native interpreter, translated some of the Fox myths and tales collected in Iowa, but his chief work in Oklahoma consisted of gaining an insight into the Sauk ceremonial and social organization. He also translated, with the assistance of a Sauk, the Kickapoo texts collected by the late Dr. William Jones, subsequently correcting the version with a Kickapoo informant. The dialectic differences between Sauk, Fox, and Kickapoo are not great, and as few of the Mexican Kickapoo now speak any but broken English, a Sauk was employed in making the first draft of the translation.

Among the Shawnee of Oklahoma Dr. Michelson's work was primarily linguistic. The results confirmed his opinion, gathered from the late Dr. Gatschet's notes and texts, that the Shawnee language is most intimately connected with Sauk, Fox, and Kickapoo, on the one hand, and with the Abnaki dialects on the other. He also gathered some Shawnee myths, partly in texts, partly on the phonograph, and a beginning was made on the Shawnee social organization. It was found that, apparently, the larger divisions are not phratries, nor are their clans exogamous, as already noted by Dr. Gatschet, despite the ordinary view. The question of exogamy or endogamy among the Shawnee is fixed merely by blood relationship.

Among the Mexican Kickapoo Dr. Michelson gathered some additional texts, corrected the translations of Dr. Jones's Kickapoo texts, as above noted, made observations on Kickapoo clan organization, and gathered also linguistic data which shed further light on the relations of the Sauk, Fox, and Kickapoo dialects.

Dr. Michelson returned to Washington about the middle of December and commenced the elaboration of his field notes. In January he visited the Carlisle Industrial School, where he procured linguistic

data on Ottawa, Turtle Mountain Chippewa, Potawatomi, Abnaki, Menominee, Sauk, and Arapaho. The most important result obtained is the fact that the so-called Turtle Mountain Chippewa is really Cree—at least such is the language of the pupils at Carlisle. Whether the entire band is Cree is another question. Dr. Michelson's opinion that Arapaho is the most divergent Algonquian dialect was confirmed, and it was made more nearly certain that Menominee distinctly belongs with Cree, not with Chippewa. Dr. Michelson returned from Carlisle in the following month, when he was compelled to submit to an operation for trachoma, which apparently had been contracted during his field researches of the previous summer. On resuming his duties it was found advisable to incorporate the linguistic notes obtained in the summer and fall of 1911 and the winter of 1911-12, so far as practicable, in his memoir on the Linguistic Classification of the Algonquian Tribes, then in galley proof preparatory to publication in the twenty-eighth annual report. The value and completeness of this paper were thereby greatly enhanced.

While in the office Dr. Michelson was frequently called on to furnish data for answering letters of inquiry, and he also found opportunity to furnish notes of addenda and corrigenda for a future edition of the Handbook of American Indians.

Mr. J. N. B. Hewitt, ethnologist, was engaged throughout the year in office work, continuing the editing and copying of the legends, traditions, and myths of the Seneca, collected by the late Jeremiah Curtin in 1884-85. Of the original list of 120 items composing this manuscript collection, 85 have been edited and typewritten, exclusive of two items which were translated from inedited texts. While the work is now practically complete, the apparent discrepancy in the number of edited and typewritten items (about 35) is due to the fact that the original list contained a number of texts of little ethnological value, being merely narratives of local and personal adventures of modern Indians with ghosts, and the like, and tales about modern witchcraft. The two items completely translated were difficult of rendering, as they were partly illegible and had been left inedited. Two or three texts of similar character remained to be translated, and on these Mr. Hewitt was engaged at the close of the fiscal year. The Seneca material collected by Mr. Curtin and placed in condition for publication by Mr. Hewitt now comprises 1,350 pages.

In addition Mr. Hewitt undertook the work of translating a number of inedited and uncorrected manuscripts bearing on Seneca traditions and legendary lore recorded by himself in 1896. Thirteen of these items were translated, aggregating 410 pages.

As in the past, Mr. Hewitt devoted considerable time to collecting and preparing data for replies to correspondents on linguistic, historical, sociological, and technical subjects, and served also as custodian of manuscripts.

Mr. Francis La Flesche, ethnologist, was engaged during the year in the further study of the tribal rites of the Osage Indians in Oklahoma. These rites are regarded by the Osage as mysterious, and, being held in great awe by the tribe, are very difficult to obtain, even by their own members. Instances are pointed out where, in the belief of the Osage, persons in officiating at ceremonies made mistakes in the form or in the recitation of the rituals and in the singing of the songs, and have therefore become insane, or blind, or have met with violent death. The murder of Saucy Calf, a man of high standing in his tribe, and the burning of his house last winter are attributed by his people to the fact that he gave away certain rituals and songs of the sacred tribal ceremonies. From Saucy Calf Mr. La Flesche had obtained the entire first degree of the No^ho^hzhi^ga rites, and while the two were together the old seer frequently expressed the fear that some harm might come to him for parting with these religious secrets. By reason of the superstitious awe in which these sacred rites are held, Mr. La Flesche's studies in this particular have been necessarily slow, since it was essential for him first to gain the full confidence of those versed therein. Notwithstanding this difficulty, he has been fortunate enough to procure the full ritual of the Hibernating of the Black Bear, which pertains to the origin of the seven and six war honors of the tribe, and is recited by the men members of the No^ho^hzhi^ga of the Black Bear clan at the sacred-bundle ceremony when the warrior chosen recounts his war honors and takes up the seven and six willow saplings to count and the songs of this part of the ceremony are being sung by the officiating priest. A related ritual, which tells of the rearing of a child to the completion of its life, is recited when a widow is being initiated into the No^ho^hzhi^ga to take the place of her husband; but Mr. La Flesche has not yet been able to record this, owing to the dread inspired by the death of Saucy Calf. However, after considerable difficulty he succeeded in obtaining six rituals from Waxrizhi, whose father, who died about a year before, is said to have been the last of the No^ho^hzhi^ga men thoroughly versed in the ancient rites.

Another ritual obtained is the Dream Ritual, with literal and free translations. This is a narration of a No^ho^hzhi^ga's fast dream of the sacred packs, a number of which have been procured and transferred to the National Museum.

Still another ritual, known as the Wi-gi-e Paho-gre, "First of the Rituals," with literal and free translations, was recorded. This tells of the coming of the Ho^ga of the Seven Fireplaces, or clans, to the earth from the sky by permission of the Sun, Moon, and Morning and Evening stars, and with the aid of the Winged Ho^ga, or "Spotted Eagle"; of their finding the earth covered with water when they descended; their having to rest on the tops of seven red-oak trees, until, by his magic power, the Elk dispersed the waters

and made dry land appear; their meeting with the crawfish, which brought from out of the earth clays of different colors to be used by the people of the Ho^{ga} clan for symbolic purposes in their No^{ho}zhi^{ga} rites. The No^{ho}zhi^{ga} are said to be exceedingly careful not to recite this ritual to anyone unless given large fees.

The ritual of the Birth of the Sacred Bird, also recorded and translated by Mr. La Flesche, relates to the adoption of the hawk as a war symbol and is in the form of a legend telling of the birth of the bird, as of a human being, to the sister of four brothers who attended the delivery of the child. The story begins with the birth, gives the details of each stage of growth, and tells of the prediction of the four brothers that their nephew was destined to become a great warrior. The child becomes fretful and wails ceaselessly until the skins of seven prey animals and a bow with a bit of scalp attached are brought to it by its uncles. For this reason no one can be initiated into the order of the No^{ho}zhi^{ga} unless he furnishes the skins of these seven animals.

The ritual of the Symbolic Painting was likewise recorded. This relates to the symbolic painting of the man who acts as the initiator in the initiation of a new member of the No^{ho}zhi^{ga} order. The paint is symbolic of the dawn and the rising sun.

Another ritual, that of the Approach to the House of Initiation, is recited by the officiating priest while he, the initiator, and the votary ceremonially approach the place of meeting of the No^{ho}zhi^{ga} for performing some of the ceremonies. It relates to the Tsi'-wa-ko-da-gi, or "mysterious house," of the Ho^{ga} clan.

The ritual of Feeding of the Fire relates to the ceremonial building of the sacred fire at the place of gathering of the No^{ho}zhi^{ga} to perform one of the ceremonies. It is an appeal to the supernatural for aid in obtaining deer for the sustenance of life and also for help to overcome the tribes which menace the lives, the peace, and the happiness of the people.

While these rituals are in themselves complete, each one forms a part of the great No^{ho}zhi^{ga} rite, which Mr. La Flesche is endeavoring to record in its entirety.

Aside from the rituals and songs, Mr. La Flesche has procured stories of the *wako'dagi*, or medicine men, and of the strange animals from which they obtained supernatural powers; he has also recorded love stories, stories of those who had died and returned to life, war stories, and myths. Some of these have been transcribed in final form. In all, the text of these stories aggregates about 250 pages. Mr. La Flesche, however, has given comparatively little attention to legends and stories of this kind, having devoted his energies chiefly to the secret rites that at one time meant so much to the Osage people, and which are so rapidly disappearing.

By agreement with Mr. Karl Moon, noted for his work in Indian photography, the bureau is to receive a series of Osage photographs, taken with the aid of Mr. La Flesche, who made the necessary arrangements with the Indians to pose for them. Mr. La Flesche received as a gift from Wano^sshezhi^aga the sacred bundle of the Eagle clan, to which he belongs. This fine specimen has been transferred to the National Museum, where it is placed with the other Osage bundles that he has been so fortunate as to obtain.

Dr. Paul Radin, ethnologist, was among the Winnebago Indians of Wisconsin at the opening of the fiscal year, having resumed his investigations of this people in the preceding month. These were continued to completion, and in October, 1911, Dr. Radin returned to Washington and continued the preparation of a monograph on the ethnology of the Winnebago tribe, which was brought to completion and submitted in the latter part of March, 1912. Although the medium of publication of this memoir has not yet been determined, it is probable that it will appear as the accompanying paper of the twenty-ninth annual report.

Dr. Franz Boas, honorary philologist, continued the linguistic researches outlined in previous reports, the immediate object of which is the completion of part 2 of the Handbook of American Indian Languages, which is to contain sketches of the native languages of Oregon and Washington, with some additional material on the extreme northwestern part of the continent. An account of the development of the plan and object of this Handbook was set forth in my last annual report.

The printing of the sketch of the Takelma grammar, by Dr. Edward Sapir, for this Handbook, has been completed, and the separates thereof have been issued. The work of Dr. Leo J. Frachtenberg unfortunately suffered delay owing to protracted illness. His revision of the Coos grammar, however, has been almost completed, and it is expected that the manuscript of the Siuslaw grammar will be in the hands of Dr. Boas, as editor of the Handbook, by August of this year. The necessary final revision of the subject matter of both sketches was made by Dr. Frachtenberg at Siletz, Oregon.

Dr. Boas rewrote a grammar of the Chukchee language, with comparative notes on the Koryak and Kamchadal, by Mr. Waldemar Bogoras, and added references to the published Russian and English series of Chukchee texts, which had been published previously by Mr. Bogoras. In the course of the year this manuscript was also typewritten and prepared for the printer. In the summer of 1912 Dr. Boas met Mr. Bogoras in Berlin and discussed with him the revised form of the grammar. At the close of the year the results of these discussions were being incorporated in the grammar, and it is expected that the manuscript will be ready for the printer early in the autumn.

Dr. Boas has followed out the policy of printing texts illustrating the grammatical sketches in a series which according to the original plan were to have been published as bulletins of the bureau, but this plan was abandoned for administrative reasons. During the present year the series of Tsimshian texts, illustrating the Tsimshian dialect, was published as Volume III of the Publications of the American Ethnological Society, and the series of Maidu texts as Volume I of the same series. These illustrate languages contained in part of the Handbook, so that now texts for all the languages therein treated are available to students.

The printing of the Coos texts, by Dr. Frachtenberg, which are to appear as Volume I of the Columbia University Contributions to Anthropology, has almost been completed, and the printed matter has been utilized to illustrate the sketch of the language.

The research in Indian music by Miss Frances Densmore was characterized by the completion of her studies among the Chippewa and the beginning of investigations along similar lines among the Sioux. Miss Densmore's field work comprised one month with the Sioux on the Sisseton Reservation in South Dakota, about two months on Standing Rock Reservation in North Dakota, and a few days on the White Earth Reservation in Minnesota for the final revision of some descriptions and translations in her Chippewa manuscripts. The finished results submitted during the year comprised material on both Chippewa and Sioux music. Two papers on Chippewa studies were presented, one entitled "Further Analysis of Chippewa Songs," the other bearing the title "Deductions from the Analysis of Chippewa Music." In addition Miss Densmore finished about 100 pages that included additional references to the bibliography of the subject, a more complete explanation of minor points, some linguistic analyses, and slight changes in the analysis of individual songs to conform with present methods—all this was complete for publication when submitted. Her paper on "The Sun Dance of the Teton Sioux," including 33 songs, could be published in its present form, but it is deemed desirable to add a structural analysis of the songs similar to that accompanying the Chippewa material.

Additional illustrations for the Chippewa studies have been submitted during the year, also adequate illustrations for the paper on the Sun dance of the Sioux. With few exceptions these illustrations are photographs taken especially for the work, many being pictures of old ceremonial articles used in the Sun dance. Considerable attention also has been given to the collecting of specimens having an interest in connection with the work.

Mr. W. H. Holmes, head curator of the department of anthropology of the United States National Museum, has continued, as opportunity afforded, the preparation of the Handbook of Archeology

commenced by him while chief of the bureau. The main body of the research work in connection with this Handbook has been completed, but much remains in the way of literary investigation and in the preparation of illustrations. While no time can yet be fixed for the completion of the work, Mr. Holmes hopes to finish the manuscript and the illustrations for the first volume before the summer of 1913.

Good progress has been made in transcribing the manuscript French-Miami dictionary, by an unknown author but attributed to Père Joseph Ignatius Le Boulanger, in the John Carter Brown Library at Providence, Rhode Island. The copying has been made possible through the courtesy of Mr. George Parker Winship, librarian, who not only has placed this valuable manuscript at the disposal of the bureau for this purpose, but has kindly permitted his assistant, Miss Margaret Bingham Stillwell, to prepare the transcript, and personally has supervised the making of photostat copies of part of the manuscript, especially that devoted to the text portion. During the year Miss Stillwell finished and submitted the transcript of 295 pages, representing pages 20 to 77 of the original.

Prof. Howard M. Ballou, of the College of Hawaii, has continued the search for titles for the proposed List of Works Relating to Hawaii, especially those of works published locally in the native language, many of which are very rare. In this work Prof. Ballou has had the generous assistance of the Rev. Mr. Westervelt. This bibliography has now reached a stage where steps should soon be taken toward finally arranging the material for publication.

There has long been need of a revision of the Catalogue of Pre-historic Works East of the Rocky Mountains, prepared by the late Dr. Cyrus Thomas and published as a bulletin of the bureau in 1891, but which passed out of print several years ago. In the fall of 1911 steps were taken toward undertaking this revision, and the bureau was fortunate at the outset in engaging the services of Mr. D. I. Bushnell, jr., of University, Virginia, as compiler of the work. Circular letters were dispatched to county clerks east of the Mississippi, who not only supplied direct information respecting aboriginal sites, but furnished the names of hundreds of collectors and others having personal knowledge of the subject, and to these special letters were addressed. By this means so much information of a local character was received in regard to the location of mounds, village and camp sites, shell heaps, quarries and workshops, pictographs, etc., in addition to that recorded in the Catalogue of Dr. Thomas, that the revised work gives promise of being a fairly complete Handbook of Aboriginal Remains East of the Mississippi. Besides finishing the collation of this material and of other data already in possession of the bureau, Mr. Bushnell has made good progress in extracting the information contained in various publications devoted to American archeology,

notably those by Mr. Clarence B. Moore on the mounds of the South. In this compilation the bureau has had the generous cooperation of Mr. Arthur C. Parker, State archeologist of New York, and of Mr. Warren K. Moorehead, curator of the department of archeology of Phillips Academy, Andover, Massachusetts, while others have kindly offered their aid. No date for the publication can yet be given.

PUBLICATIONS.

The editorial work of the bureau has been conducted under the immediate charge of Mr. J. G. Gurley, editor. The proof reading of the twenty-seventh annual report, the accompanying paper of which is a monograph entitled "The Omaha Tribe," by Alice C. Fletcher and Francis La Flesche, was completed and the report published.

The manuscript of the twenty-eighth annual report was edited and transmitted to the Public Printer. At the close of the year about one-third of this report was in page form, and the remainder was in process of paging. This report includes the following papers: *Casa Grande, Arizona*, by Dr. J. Walter Fewkes; *Antiquities of the Upper Verde River and Walnut Creek Valley, Arizona*, also by Dr. Fewkes; and *Preliminary Report on the Linguistic Classification of Algonquian Tribes*, by Dr. Truman Michelson.

The series of bulletins was increased by the addition of Bulletin 47, *A Dictionary of the Biloxi and Ofo Languages, Accompanied by Thirty-one Biloxi Texts and Numerous Biloxi Phrases*, by James Owen Dorsey and John R. Swanton.

Bulletin 49, *List of Publications of the Bureau*, was issued in third impression.

Bulletin 40, *Handbook of American Indian Languages, Part 2*, was carried toward completion under the editorship of Dr. Franz Boas as elsewhere stated, with the result that two sections, comprising 41 pages, dealing with the Takelma and Coos languages, are in substantially final form.

Toward the close of the year steps were taken to advance the work on Bulletin 46, *Byington's Choctaw Dictionary*, edited by Dr. John R. Swanton.

Considerable time was given to the editing and proof reading of Bulletin 52, *Early Man in South America*, by Aleš Hrdlička, in collaboration with W. H. Holmes, Bailey Willis, Fred. Eugene Wright, and Clarence N. Fenner. At the close of June the work was nearly through press.

The last bulletin to receive attention was No. 53—*Chippewa Music—II*, by Frances Densmore. Substantial progress on the preparation of the author's material for the press had been made at the close of the fiscal year.

The demand for the publications of the bureau continues to increase, and their distribution, numbering 15,003 copies during the year, necessitated extended correspondence. The distribution of the bureau publications has been under the immediate care of Miss Helen Munroe and Mr. E. L. Springer, of the Smithsonian Institution.

A concurrent resolution authorizing the reprinting of the Handbook of American Indians was introduced in the Senate and passed on May 11, 1912, and subsequently was favorably reported by the Committee on Printing of the House of Representatives, but it had not been passed at the close of the fiscal year.

ILLUSTRATIONS.

The preparation of the illustrations for the publications of the bureau and the photographing of the members of visiting delegations of Indians were conducted under the charge of Mr. De Lancey Gill, illustrator. In connection with this work 90 photographic negatives of Indians and 123 of ethnologic subjects were prepared; 196 films exposed by members of the bureau in the field were developed; 1,322 prints were made for publication and for exchange or distribution; and 110 pen and brush drawings were prepared. At the request of Mr. Wilberforce Eames, of the New York Public Library, a collection of 118 photographs of representative Indians, covering 55 tribes, was furnished by the bureau as a part of a loan exhibition opened at that library in May and was still on view at the close of the fiscal year.

Mr. Gill had the usual assistance of Henry Walther until February 16, 1912, when his services in behalf of the bureau for many years came to a close with his death. Mr. Walther has been succeeded by Walter A. Stenhouse.

LIBRARY.

Under the supervision of Miss Ella Leary the work of the library has made satisfactory progress. During the year 720 volumes (103 by purchase) and 300 pamphlets were received; in addition 620 periodical publications, of which 606 were acquired by exchange and the remainder by subscription, were accessioned. The recataloging of certain serial publications in the library has been continued, and attention given to the preparation of a subject catalogue of the large collection of pamphlets, many of which had been stored and therefore were inaccessible for three or four years. Successful effort has been made to complete the sets of certain publications of scientific societies and other learned institutions. For the use of the members of the staff the librarian has prepared and posted copies of a monthly bulletin of the library's principal accessions; and in order that the

large number of scientific serials received might also be made readily accessible, the current issues have been displayed on a table provided for that purpose.

Notwithstanding the increasing value of the bureau's library, it was found necessary, from time to time, to make requisition on the Library of Congress for the loan of books, the volumes thus received for temporary use numbering about 250. The volumes bound during the year numbered 492. At the close of the year the library contained approximately 17,970 volumes, about 12,500 pamphlets, and several thousand periodicals. Although maintained primarily as a reference library for the bureau's staff, it is constantly consulted by students not connected with the Smithsonian Institution and by officials of the executive departments and the Library of Congress.

COLLECTIONS.

The following collections were made by members of the staff of the bureau during their field researches:

By Mr. F. W. Hodge: Twenty-two paper squeezes of early and recent Spanish inscriptions on El Morro, or Inscription Rock, New Mexico. Objects of stone, bone, clay, etc., from the cemetery of the ancient ruined pueblo of Kwasteyukwa on the mesa above the Jemez Hot Springs, New Mexico. Ten barrels of pottery and human skeletal remains from the same locality. These collections were made under a joint expedition conducted by the bureau and the School of American Archæology.

By Dr. John R. Swanton: Two ball sticks, one ball, one breechcloth and belt, one tiger tail, from the Creek Indians at Coweta, Oklahoma.

By Mr. James Mooney: Four dance masks, two pairs of ball sticks, two toy baskets, two wooden spoons, one ox muzzle, one stone ax, one small celt, three arrowheads, from the Cherokee Indians of North Carolina.

By Mr. Francis La Flesche: Two sacred packs of the Osage Indians.

PROPERTY.

The most valuable part of the property of the bureau consists of its library, manuscripts (chiefly linguistic), and photographic negatives. The bureau possesses also cameras, photographic machines, and other ordinary apparatus and equipment for field work; stationery and office supplies; necessary office furniture; typewriters, etc., and the undistributed stock of its publications. The amount of \$342.27 was expended for office furniture during the year, while the cost of necessary books and periodicals was \$396.42.

As in the past, the manuscripts have been under the custodianship of Mr. J. N. B. Hewitt. Those withdrawn by collaborators of the bureau during the year numbered 234 items. The new manuscripts acquired are those hitherto mentioned in this report as having been prepared by members of the staff or by collaborators and designed for eventual publication. Negotiations have been entered into with the heirs of the late Señor Andomaro Molina, of Merida, Yucatan, for the return of Henderson's Maya Dictionary, a manuscript of six volumes lent to Señor Molina a number of years ago for use in connection with certain linguistic studies then contemplated in behalf of the bureau.

RECOMMENDATIONS.

I desire to repeat the recommendations submitted in my last annual report, respecting the extension of the researches of the bureau and for other purposes, and urging the appropriation of the necessary funds for conducting them. These include the following projects:

The exploration and preservation of antiquities in the arid region.

The extension of ethnologic researches in Alaska and among the tribes of the Mississippi Valley.

The preparation of a completely revised edition of the Handbook of American Indians.

Additional editorial assistance in preparing the publications of the bureau for the press.

A small sum to meet the expense of supplying photographs of Indian subjects to schools and colleges, and for other educational purposes, and for systematically making photographs in the field to illustrate the daily life and the ceremonies of the Indians.

In addition it is recommended that the systematic excavation and study of certain archeological sites in the South and West be conducted in order that archeological research may go hand in hand with the ethnological studies now being pursued in the same fields.

The reasons for extending the work of the bureau in the directions indicated are set forth more fully in the estimates of appropriations for the year 1914, in connection with which the sums regarded as necessary to the work are given.

Respectfully submitted.

F. W. HODGE,
Ethnologist in Charge.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1912:

The congressional appropriation for the support of the service during the year, including the allotment for printing and binding was \$32,200 (the same amount as granted for the past four years) and the repayments for services rendered were \$4,391.02, making the total available resources for carrying on the system of international exchanges \$36,591.02.

The total number of packages handled during the year was 315,492—an increase over the number for the preceding year of 29,794. The weight of these packages was 568,712 pounds—a gain of 7,904 pounds. The increase in the volume of business, which has been continuous since the establishment of the service, is shown in the diagram on page 59.

The publications dispatched by the Exchange Service are classified under four heads: First, the Congressional Record; second, "Parliamentary documents"; third, "Departmental documents"; fourth, "Miscellaneous scientific and literary publications."

The term "Parliamentary documents," as here used, refers to publications set aside by law for exchange with foreign Governments and includes not only copies of documents printed by order of either House of Congress, but copies of each publication issued by any department, bureau, commission, or officer of the Government. The object in sending these publications abroad is to procure for the use of the Congress of the United States a complete series of the publications of other Governments, and the returns are deposited in the Congressional Library.

The term "Departmental documents" embraces all the publications delivered at the Institution by the various Government departments, bureaus, or commissions, for distribution to their correspondents abroad from whom they desire to obtain similar publications in exchange. The publications received in return are deposited in the various departmental libraries.

The "Miscellaneous scientific and literary publications" are received chiefly from learned societies, universities, colleges, scientific

institutes, and museums in the United States, and transmitted to similar institutions in all parts of the world.

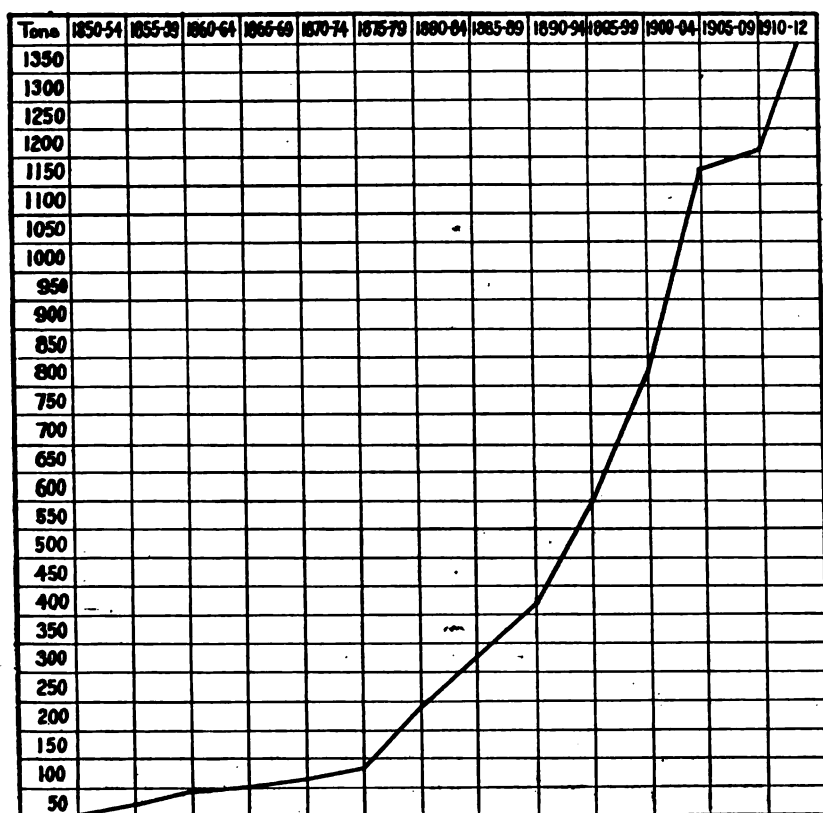


Diagram showing increase of exchange transmissions, in tons of 2,000 pounds, from 1850 to 1912, divided into periods of five years each.

For purposes of comparison, the number and weight of packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad	136,722		128,253	
Publications received in return for parliamentary documents.....		2,425		17,794
United States departmental documents sent abroad	72,438		180,990	
Publications received in return for departmental documents.....		9,452		19,113
Miscellaneous, scientific, and literary publications sent abroad..	56,110		113,593	
Miscellaneous, scientific, and literary publications received from abroad for distribution in the United States		38,345		108,969
Total.....	265,270	50,222	422,836	145,876
Grand total.....	315,492		568,712	

The disparity indicated by the foregoing statistics between the number of packages sent and those received in behalf of the Government is accounted for, in part, by the fact that packages sent abroad contain, as a rule, only one publication, while those received in return often comprise many volumes, in some instances, especially in the case of publications received in return for parliamentary documents, the term "package" being applied to large boxes containing 100 or more separate publications, of which no lists are made in Washington, as the boxes are forwarded to their destinations unopened. Furthermore, many returns for publications sent abroad reach their destinations direct by mail and not through the Exchange Service.

Proper allowance being made for these circumstances, it is, nevertheless, apparently true that the publications of the United States Government sent to foreign countries greatly exceed in number those received by the Library of Congress and the several executive departments, bureaus, and independent offices. This in turn appears to be due mainly to the fact that most foreign Governments publish less extensively on scientific and other subjects than our own. The fiscal relations between the Government and scientific and other institutions are more complex in many countries than is the case in the United States, and the distinction between public documents and other publications is not so clear, especially where the printing for the Government is not centralized in one office or is not done by the Government itself.

While several of the departments and bureaus of our own Government have expressed themselves satisfied with the returns received through the Exchange Service, it is proposed to make a further investigation of this subject for the purpose of ascertaining whether some important publications and series of publications have not been overlooked, and also what proportion the number of the publications issued by certain European Governments in a given year bears to the number received by the departments and bureaus of the United States Government, and to the number sent to the former. It will be obvious that a debit and credit account is out of the question in the case of this kind. While a scientific or literary institution issues publications for the benefit of the whole world, a Government issues reports and other documents mainly for purposes of record and for the information of its own officers and its own citizens. The more largely the people are directly concerned in the Government, and the more extended its interests and activities, the greater will be the output of reports and other publications. Such a Government will have much more to offer than it can expect to receive in return from a smaller country.

As regards the exchange of miscellaneous scientific and literary publications, it will be noted that the weight in pounds of the

received into the United States through the Exchange Service during the fiscal year 1911 more than doubled the weight of those sent abroad, while the weight of those received during the fiscal year 1912, covered by this report, almost equalled that of those sent abroad. There is every reason, therefore, to believe that this important branch of the work yields adequate returns.

By referring to the foregoing table it will be noted that 70 per cent of the work of the office has been conducted in behalf of United States governmental establishments.

Of the 2,395 boxes used in forwarding exchanges to foreign bureaus and agencies for distribution (an increase of 15 boxes over 1911), 328 boxes contained full sets of United States official documents for authorized depositories and 2,067 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges to foreign countries.

Country.	Number of boxes.	Date of transmission.
Argentina.....	26	July 15, Aug. 16, Sept. 20, Oct. 13, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Austria.....	83	July 12, Aug. 3, Sept. 7, Oct. 6, Nov. 14, Dec. 6, 1911; Jan. 10, Feb. 7, Mar. 6, Apr. 3, May 8, June 5, 1912.
Barbados.....	2	Mar. 27, June 27, 1912.
Belgium.....	62	July 8, 20, Aug. 12, 20, Sept. 23, Oct. 14, Nov. 4, 25, Dec. 16, 1911; Jan. 6, 27, Feb. 17, Mar. 16, 30, Apr. 27, May 13, June 8, 1912.
Bermuda.....	1	Feb. 15, 1912.
Bolivia.....	12	Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Mar. 22, May 23, June 22, 1912.
Brazil.....	31	July 15, Aug. 16, Sept. 20, Oct. 13, Nov. 25, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
British Colonies.....	12	July 3, Aug. 12, 21, Sept. 2, Oct. 30, Nov. 4, 1911; Jan. 6, 20, 27, Apr. 27, June 8, 1912.
British Guiana.....	2	Jan. 30, June 29, 1912.
British Honduras.....	1	Jan. 30, 1912.
Bulgaria.....	3	July 28, Sept. 29, Nov. 7, 1911.
Canada.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Cape Colony.....	12	Aug. 5, Nov. 7, 1911; Jan. 25, Apr. 15, May 31, June 27, 1912.
Chile.....	22	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 24, June 22, 1912.
China.....	23	July 21, Aug. 26, Sept. 29, Nov. 4, Dec. 29, 1911; Jan. 31, Feb. 28, Mar. 27, Apr. 30, May 31, June 27, 1912.
Colombia.....	14	Aug. 21, Sept. 23, Nov. 23, 1911; Jan. 20, Feb. 20, Apr. 22, May 23, 1912.
Costa Rica.....	17	July 27, Aug. 21, Sept. 23, Oct. 27, Nov. 23, 1911; Jan. 20, Feb. 24, Apr. 22, May 23, June 22, 1912.
Cuba.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Denmark.....	31	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 20, Feb. 20, Mar. 15, Apr. 15, May 20, June 20, 1912.
Ecuador.....	7	Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.

Consignments of exchanges to foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Egypt.....	13	July 22, Aug. 25, Sept. 26, Oct. 28, Nov. 25, 1911; Jan. 13, Feb. 3, 9, Apr. 6, May 4, June 8, 1912.
France.....	207	July 6, 26, Aug. 10, 24, Sept. 15, 28, Oct. 12, Nov. 1, 23, Dec. 8, 21, Jan. 4, 25, Feb. 8, 29, Mar. 14, 28, Apr. 4, 25, May 9, June 6, 27, July 6, 11, 18, 25, Aug. 1, 8, 15, 22, 29, Sept. 2, 12, 19, 26, Oct. 3, 10, 31, Nov. 7, 14, 21, 28, Dec. 5, 12, 19, 1911; Jan. 3, 9, 16, 23, 30, Feb. 13, 20, 27, Mar. 5, 12, 19, 26, Apr. 2, 9, 16, 23, 30, May 7, 15, 21, 28, 4, 11, 18, 25, 1912.
Germany.....	410	July 3, 8, 15, 22, 29, Aug. 5, 12, 19, 26, Sept. 2, 11, 18, 23, 30, Oct. 7, 14, 30, Nov. 4, 11, 18, 25, Dec. 2, 9, 16, 27, 1911; Jan. 6, 13, 20, 27, Feb. 17, 24, Mar. 2, 9, 16, 23, 30, Apr. 6, 13, 20, 27, May 4, 11, 18, 25, June 15, 22, 29, 1912.
Great Britain and Ireland.....	423	July 3, 8, 15, 22, 29, Aug. 5, 12, 19, 26, Sept. 2, 11, 18, 23, 30, Oct. 7, 14, 30, Nov. 4, 11, 18, 25, Dec. 2, 9, 16, 27, 1911; Jan. 6, 13, 20, 27, Feb. 17, 24, Mar. 2, 9, 16, 23, 30, Apr. 6, 13, 20, 27, May 4, 11, 18, 25, June 15, 22, 29, 1912.
Greece.....	19	July 28, Aug. 29, Sept. 27, Nov. 7, Dec. 28, 1911; Jan. 25, Feb. 26, 27, Apr. 25, May 25, June 27, 1912.
Guatemala.....	8	July 27, Aug. 29, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, 22, 1912.
Haiti.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Honduras.....	7	July 27, Sept. 28, Nov. 13, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.
Hungary.....	39	July 12, Aug. 3, Sept. 7, Oct. 6, Nov. 14, Dec. 6, 1911; Jan. 10, Feb. 13, Mar. 6, Apr. 3, May 8, June 5, 1912.
India.....	38	July 3, 29, Aug. 5, 12, Sept. 2, 18, 23, Oct. 14, 23, 30, Nov. 4, 18, 25, Jan. 6, 20, 30, Feb. 17, 24, Mar. 9, 16, 23, 30, Apr. 13, 27, May 4, June 8, 15, 22, 1912.
Italy.....	96	July 24, Aug. 5, Sept. 2, 25, Oct. 16, Nov. 11, 25, 1911; Jan. 13, Feb. 13, Mar. 9, Apr. 6, May 4, 18, June 8, 29, 1912.
Jamaica.....	8	July 27, Aug. 31, Sept. 29, Nov. 29, 1911; Jan. 30, Feb. 26, Apr. 30, 27, 1912.
Japan.....	62	July 21, Aug. 26, Sept. 27, Oct. 20, Nov. 20, Dec. 28, 1911; Jan. 23, 21, Mar. 20, Apr. 20, May 20, June 20, 1912.
Korea.....	4	Sept. 29, 1911; Feb. 26, Mar. 27, June 27, 1912.
Liberia.....	5	July 27, Sept. 29, Nov. 13, 1911; Feb. 26, June 27, 1912.
Lourenco Marques.....	2	Nov. 13, 1911; June 22, 1912.
Manitoba.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Mexico.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Montenegro.....	3	Nov. 13, 1911; Feb. 24, June 22, 1912.
Natal.....	2	Sept. 2, 1911; Feb. 24, 1912.
Netherlands.....	60	July 11, 29, Aug. 29, Sept. 19, Oct. 17, Nov. 14, 28, Dec. 12, 1911; Jan. 30, Feb. 27, Mar. 12, 26, Apr. 9, 23, May 7, June 4, 25, 1912.
Newfoundland.....	2	Jan. 16, Apr. 11, 1912.
New South Wales.....	33	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 15, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
New Zealand.....	28	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Nicaragua.....	5	Aug. 29, Sept. 28, 1911; Jan. 30, Feb. 24, June 22, 1912.
Norway.....	28	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 30, Feb. 20, Mar. 15, Apr. 15, May 20, June 20, 1912.
Ontario.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.
Panama.....	3	Nov. 13, 1911; Feb. 24, June 22, 1912.
Palestine.....	4	Aug. 31, Nov. 29, 1911; June 27, 1912.
Peru.....	18	July 15, Aug. 16, Sept. 20, Oct. 18, Nov. 23, Dec. 27, 1911; Jan. 20, 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Portugal.....	19	July 19, Aug. 24, Sept. 27, Oct. 19, Nov. 16, Dec. 19, 1911; Jan. 20, 20, Mar. 15, Apr. 16, May 20, June 20, 1912.
Quebec.....	6	Aug. 10, Nov. 10, 1911; Jan. 10, Apr. 1, 25, June 1, 1912.

Consignments of exchanges to foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
Queensland.....	21	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 28, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Roumania.....	10	July 28, Sept. 29, Nov. 7, 1911; Apr. 10, May 31, June 27, 1912.
Russia.....	81	July 13, Aug. 4, Sept. 7, Oct. 6, Nov. 11, Dec. 7, 1911; Jan. 11, Feb. 8, Mar. 7, Apr. 4, May 9, 29, 1912.
Salvador.....	7	Aug. 29, Sept. 28, Nov. 29, 1911; Jan. 30, Feb. 24, Apr. 30, June 22, 1912.
Santo Domingo.....	1	Sept. 29, 1911.
Servia.....	12	Aug. 29, Nov. 7, 1911; Jan. 24, May 7, June 27, 1912.
Slam.....	10	July 28, Oct. 10, Nov. 4, Dec. 29, 1911; Jan. 31, Feb. 26, Mar. 28, Apr. 30, May 31, June 29, 1912.
South Australia.....	19	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 15, Mar. 20, Apr. 20, May 20, June 20, 1912.
Spain.....	30	July 22, Aug. 25, Sept. 26, Oct. 28, Nov. 25, 1911; Jan. 13, Feb. 3, Mar. 9, Apr. 6, May 4, June 8, 29, 1912.
Sweden.....	54	July 13, Aug. 4, Sept. 7, Oct. 6, Nov. 11, Dec. 7, 1911; Jan. 11, Feb. 8, Mar. 7, Apr. 4, May 6, June 6, 1912.
Switzerland.....	53	July 8, 29, Aug. 10, 29, Sept. 23, Oct. 14, Nov. 4, 25, Dec. 16, 1911; Jan. 6, 27, Feb. 16, Mar. 16, 30, Apr. 27, May 18, June 8, 1912.
Syria.....	4	Nov. 2, 1911; Feb. 5, 1912.
Tasmania.....	10	Oct. 30, Nov. 4, 1911; Jan. 6, Apr. 27, 1912.
Transvaal.....	19	July 27, Aug. 29, Sept. 28, Nov. 7, 1911; Jan. 25, Feb. 24, Mar. 27, Apr. 26, May 22, June 22, 1912.
Trinidad.....	4	Aug. 31, 1911; Jan. 30, Mar. 27, June 27, 1912.
Turkey.....	15	Aug. 30, Nov. 2, 1911; Jan. 31, Feb. 28, Mar. 28, Apr. 30, May 31, 1912.
Uruguay.....	19	July 15, Aug. 21, Sept. 20, Oct. 27, Nov. 23, Dec. 27, 1911; Jan. 20, Feb. 20, Mar. 22, Apr. 22, May 23, June 22, 1912.
Venezuela.....	14	Aug. 21, Sept. 28, Nov. 23, 1911; Jan. 20, Feb. 20, Apr. 22, May 23, June 23, 1912.
Victoria.....	33	July 20, Aug. 22, Sept. 21, Oct. 28, Nov. 25, Dec. 21, 1911; Jan. 24, Feb. 17, Mar. 20, Apr. 20, May 20, June 20, 1912.
Western Australia.....	20	July 22, 29, Aug. 5, 26, Sept. 2, 23, Oct. 7, 23, 30, Dec. 16, 1911; Jan. 6, 27, Mar. 16, Apr. 27, May 18, 1912.

For some years the Institution has been sending full sets of governmental documents to Cape Colony and the Transvaal and partial sets to Natal and the Orange River Colony. In May, 1912, a communication was received from the Secretary for the Interior of the Union of South Africa stating that since these Governments have now become Provinces of the Union, only one set of the publications would in future be required. In accordance with this request, the forwarding of official documents to the above-mentioned Provinces was discontinued, and one full series, beginning with box 133, is now transmitted to the Union of South Africa, addressed to the Secretary for the Interior, care of the Government Printer, Pretoria.

Packages containing scientific and literary publications received from individuals and establishments in the United States for transmission through the Exchange Service to miscellaneous addresses in the various Provinces of the Union of South Africa are now for-

warded to certain governmental establishments in those Provinces for distribution. The department of the interior of that country has been asked to undertake the distribution and also to forward to the United States such books as may be sent in return—the department acting in the same capacity for the Union of South Africa as this Exchange Service does for the United States.

Through the wrecking of the steamship *Papanui*, the Institution lost cases 117 and 158, containing exchanges for distribution in Western Australia by the Public Library at Perth. A number of packages sent in care of the director general of stores, India Office, London, were also lost at sea during the year, owing to the stranding of the steamer by which they were being transmitted to India. It is gratifying to state that the Institution has succeeded in procuring from the senders copies of most of the lost publications, which have been duly transmitted to their various destinations.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

The number of sets of United States official publications regularly forwarded to foreign countries in accordance with treaty stipulations and under the authority of the congressional resolutions of March 2, 1867, and March 2, 1901, has been reduced from 89 to 86—one set instead of four now being forwarded to the Union of South Africa, to which reference is made above. This reduction in the number of sets transmitted abroad will be only temporary, as negotiations are now under way looking to the establishment of new exchanges.

The recipients of the 54 full and 32 partial sets are as follows:

DEPOSITORIES OF FULL SETS.

- Argentina: Ministerio de Relaciones Exteriores, Buenos Aires.
- Argentina: Biblioteca de la Universidad Nacional de La Plata.
- Australia: Library of the Commonwealth Parliament, Melbourne.
- Austria: K. K. Statistische Central-Commission, Vienna.
- Baden: Universitäts-Bibliothek, Freiburg.
- Bavaria: Königliche Hof- und Staats-Bibliothek, Munich.
- Belgium: Bibliothèque Royale, Brussels.
- Brazil: Bibliotheca Nacional, Rio de Janeiro.
- Canada: Parliamentary Library, Ottawa.
- Chile: Biblioteca del Congreso Nacional, Santiago.
- China: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
- Colombia: Biblioteca Nacional, Bogota.
- Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
- Cuba: Secretaria de Estado (Asuntos Generales y Canje Internacional), Habana.
- Denmark: Kongelige Bibliotheket, Copenhagen.

England: British Museum, London.
 England: London School of Economics and Political Science, London.
 France: Bibliothèque Nationale, Paris.
 France: Préfecture de la Seine, Paris.
 Germany: Deutsche Reichstags-Bibliothek, Berlin.
 Greece: Bibliothèque Nationale, Athens.
 Haiti: Secrétairerie d'État des Relations Extérieures, Port au Prince.
 Hungary: Hungarian House of Delegates, Budapest.
 India: Department of Education (Books), Government of India, Calcutta.
 Ireland: National Library of Ireland, Dublin.
 Italy: Biblioteca Nazionale Vittorio Emanuele, Rome.
 Japan: Imperial Library of Japan, Tokyo.
 Manitoba: Provincial Library, Winnipeg.
 Mexico: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
 Netherlands: Library of the States General, The Hague.
 New South Wales: Board for International Exchanges, Sydney.
 New Zealand: General Assembly Library, Wellington.
 Norway: Storthingets Bibliothek, Christiania.
 Ontario: Legislative Library, Toronto.
 Peru: Biblioteca Nacional, Lima.
 Portugal: Bibliotheca Nacional, Lisbon.
 Prussia: Königliche Bibliothek, Berlin.
 Quebec: Legislative Library, Quebec.
 Queensland: Parliamentary Library, Brisbane.
 Russia: Imperial Public Library, St. Petersburg.
 Saxony: Königliche Oeffentliche Bibliothek, Dresden.
 Serbia: Section Administrative du Ministère des Affaires Etrangères, Belgrade.
 South Australia: Parliamentary Library, Adelaide.
 Spain: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
 Sweden: Kungliga Biblioteket, Stockholm.
 Switzerland: Bibliothèque Fédérale, Berne.
 Tasmania: Parliamentary Library, Hobart.
 Turkey: Department of Public Instruction, Constantinople.
 Union of South Africa: Department of the Interior, Pretoria, Transvaal.
 Uruguay: Oficina de Canje Internacional de Publicaciones, Montevideo.
 Venezuela: Biblioteca Nacional, Caracas.
 Victoria: Public Library, Melbourne.
 Western Australia: Public Library of Western Australia, Perth.
 Württemberg: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

Alberta: Legislative Library, Edmonton.
 Alsace-Lorraine: K. Ministerium für Elsass-Lothringen, Strassburg.
 Bolivia: Ministerio de Colonización y Agricultura, La Paz.
 Bremen: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 British Columbia: Legislative Library, Victoria.
 Bulgaria: Minister of Foreign Affairs, Sofia.
 Ceylon: United States Consul, Colombo.
 Ecuador: Biblioteca Nacional, Quito.
 Egypt: Bibliothèque Khédiviale, Cairo.
 Guatemala: Secretary of the Government, Guatemala.

Hamburg: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
 Hesse: Grossherzogliche Hof-Bibliothek, Darmstadt.
 Honduras: Secretary of the Government, Tegucigalpa.
 Jamaica: Colonial Secretary, Kingston.
 Liberia: Department of State, Monrovia.
 Lourenço Marquez: Government Library, Lourenço Marquez.
 Malta: Lieutenant Governor, Valetta.
 Montenegro: Ministère des Affaires Étrangères, Cetinje.
 New Brunswick: Legislative Library, Fredericton.
 Newfoundland: Colonial Secretary, St. John's.
 Nicaragua: Superintendente de Archivos Nacionales, Managua.
 Northwest Territories: Government Library, Regina.
 Nova Scotia: Provincial Secretary of Nova Scotia, Halifax.
 Panama: Secretaría de Relaciones Exteriores, Panama.
 Paraguay: Oficina General de Inmigracion, Asuncion.
 Prince Edward Island: Legislative Library, Charlottetown.
 Roumania: Academia Romana, Bucarest.
 Salvador: Ministerio de Relaciones Exteriores, San Salvador.
 Slam: Department of Foreign Affairs, Bangkok.
 Straits Settlements: Colonial Secretary, Singapore.
 United Provinces of Agra and Oudh: Under Secretary to Government, Al-
 habad.
 Vienna: Bürgermeister der Haupt- und Residenz-Stadt.

No countries were added during the year to the list of those with which the immediate exchange of official parliamentary journals is carried on. While the number of countries at present taking part in this exchange with the United States is 29, the total number of copies of the Congressional Record transmitted is 34—2 copies being sent to some of the countries, 1 to the upper and 1 to the lower House of Parliament.

The Records are received from the Government Printing Office the morning following the date of their issue. They are at once placed in envelopes and forwarded to their destinations by mail.

A complete list of countries to which the Congressional Record is now sent is given below:

Argentine Republic.	Great Britain.	Roumania.
Australia.	Greece.	Russia.
Austria.	Guatemala.	Servia.
Baden.	Honduras.	Spain.
Belgium.	Hungary.	Switzerland.
Brazil.	Italy.	Transvaal.
Canada.	New South Wales.	Union of South Africa.
Cuba.	New Zealand.	Uruguay.
Denmark.	Portugal.	Western Australia.
France.	Prussia.	

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of bureaus or agencies through which the distribution of exchanges is effected. Those in the larger and many in the smaller countries forward to the Smithsonian Institution, in return, contributions for distribution in the United States:

Algeria, via France.

Angola, via Portugal.

Argentina: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

Austria: K. K. Statistische Central-Commission, Vienna.

Azores, via Portugal.

Belgium: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

Bolivia: Oficina Nacional de Estadística, La Paz

Brazil: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

British Colonies: Crown Agents for the Colonies, London.¹

British Guiana: Royal Agricultural and Commercial Society, Georgetown.

British Honduras: Colonial Secretary, Belize.

Bulgaria: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

Canary Islands, via Spain.

Cape Colony: Government Stationery Department, Cape Town.

Chile: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

China: Zi-ka-wei Observatory, Shanghai.

Colombia: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

Costa Rica: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

Denmark: Kongelige Danske Videnskabernes Selskab, Copenhagen.

Dutch Guiana: Surinaamsche Koloniale Bibliotheek, Paramaribo.

Ecuador: Ministerio de Relaciones Exteriores, Quito.

Egypt: Director-General, Survey Department, Giza (Mudiria).

France: Service Français des Echanges Internationaux, 110 Rue de Grenelle, Paris.

Germany: Amerika-Institut, Berlin, N. W. 7.

Great Britain and Ireland: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

Greece: Bibliothèque Nationale, Athens.

Greenland, via Denmark.

Guadeloupe, via France.

Guatemala: Instituto Nacional de Varones, Guatemala.

Guinea, via Portugal.

Haiti: Secrétaire d'Etat des Relations Extérieures, Port au Prince.

Honduras: Biblioteca Nacional, Tegucigalpa.

Hungary: Dr. Julius Pikler, Municipal Office of Statistics, City Hall, Budapest.

Iceland, via Denmark.

India: India Store Department, India Office, London.

Italy: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

Jamaica : Institute of Jamaica, Kingston.

Japan : Imperial Library of Japan, Tokyo.

Java, via Netherlands.

Korea : His Imperial Japanese Majesty's Residency-General, Seoul.

Liberia : Department of State, Monrovia.

Lourenço Marquez : Government Library, Lourenço Marquez.

Luxemburg, via Germany.

Madagascar, via France.

Madeira, via Portugal.

Montenegro : Ministère des Affaires Étrangères, Cetinje.

Mozambique, via Portugal.

Natal : High Commissioner for the Union of South Africa, London.

Netherlands : Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.

New Guinea, via Netherlands.

New South Wales : Board for International Exchanges, Public Library, Sydney.

New Zealand : Dominion Museum, Wellington.

Nicaragua : Ministerio de Relaciones Exteriores, Managua.

Norway : Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.

Panama : Secretaría de Relaciones Exteriores, Panama.

Paraguay : Ministerio de Relaciones Exteriores, Asuncion.

Persia : Board of Foreign Missions of the Presbyterian Church, New York City.

Peru : Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.

Portugal : Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.

Queensland : Chief Secretary's Office, Brisbane.

Russia : Commission Russe des Echanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.

Salvador : Ministerio de Relaciones Exteriores, San Salvador.

Servia : Section Administrative du Ministère des Affaires Etrangères, Belgrade.

Siam : Department of Foreign Affairs, Bangkok.

South Australia : Public Library of South Australia, Adelaide.

Spain : Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.

Sumatra, via Netherlands.

Sweden : Kongliga Svenska Vetenskaps Akademien, Stockholm.

Switzerland : Service des Echanges Internationaux, Bibliothèque Fédérale Centrale, Bern.

Syria : Board of Foreign Missions of the Presbyterian Church, New York.

Tasmania : Royal Society of Tasmania, Hobart.

Transvaal : Government Library, Pretoria.

Trinidad : Victoria Institute, Port of Spain.

Tunis, via France.

Turkey : American Board of Commissioners for Foreign Missions, Boston.

Uruguay : Oficina de Canje Internacional, Montevideo.

Venezuela : Biblioteca Nacional, Caracas.

Victoria : Public Library of Victoria, Melbourne.

Western Australia : Public Library of Western Australia, Perth.

Windward and Leeward Islands : Imperial Department of Agriculture, Bridgetown, Barbados.

Table showing the number of institutions and individuals in foreign countries to which packages were transmitted through the International Exchange Service during the first six months of the fiscal year 1912.

	Organizations.	Individuals.		Organizations.	Individuals.
Africa:			America (North)—Contd.		
Algeria.....	13	26	West Indies—Contd.		
Angola.....	1		St. Lucia.....	1	
Azores.....	4	1	St. Thomas.....	1	
Canary Islands.....	2		St. Vincent.....	1	1
Cape Colony.....	38	30	San Domingo.....	4	2
East Africa and Uganda			Trinidad.....	8	8
Protectorates.....	4	7	America (South):		
Egypt.....	21	15	Argentina.....	65	95
German East Africa.....	3	2	Bolivia.....	9	6
Gold Coast.....	1	1	Brazil.....	63	55
Lagos.....	1	1	British Guiana.....	6	4
Liberia.....	5	7	Chile.....	38	40
Lourenço Marques.....	2	1	Colombia.....	13	6
Madagascar.....	3		Dutch Guiana.....	2	
Madeira.....	1	1	Ecuador.....	9	15
Mauritius.....	7	3	French Guiana.....		1
Morocco.....		1	Paraguay.....	10	3
Natal.....	17	14	Peru.....	28	24
Orange Free State.....	3	8	Uruguay.....	19	13
Reunion.....	4	2	Venezuela.....	13	11
Rhodesia.....	2	11	Asia:		
St. Helena.....	1		Burma.....	3	6
Sierra Leone.....	3	2	Ceylon.....	12	8
Transvaal.....	22	31	China.....	24	64
Tripoli.....		3	Cyprus.....	3	1
Tunis.....	4	6	French East Indies.....	1	
Zansibar.....	1		Hongkong.....	7	3
America (North):			India.....	122	85
Canada.....	131	323	Indo-China.....	5	4
Central America—			Japan.....	95	155
British Honduras.....	6	6	Korea.....	2	8
Costa Rica.....	11	10	Macao.....	1	
Guatemala.....	10	6	Malasia—		
Honduras.....	6	6	Java.....	17	13
Nicaragua.....	4	10	Philippine Islands.....	3	1
Panama.....	1	10	Sarawak.....	2	
Salvador.....	11	10	Persia.....		2
Greenland.....	1		Siam.....	3	4
Mexico.....	48	70	Straits Settlements.....	14	8
Newfoundland.....	7	3	Australasia:		
West Indies—			New South Wales.....	50	59
Antigua.....	3	1	New Zealand.....	45	62
Bahamas.....	4	1	Queensland.....	30	22
Barbados.....	7	9	South Australia.....	25	24
Bermudas.....	2	6	Tasmania.....	19	11
Cuba.....	20	11	Victoria.....	65	67
Dominica.....	1		Western Australia.....	23	15
Grenada.....	1		Europe:		
Haiti.....	2		Austria-Hungary.....	293	424
Jamaica.....	10	9	Belgium.....	153	116
St. Christopher.....	1		Bulgaria.....	10	9

Table showing the number of institutions and individuals in foreign countries to which packages were transmitted through the International Exchange Service during the first six months of the fiscal year 1912—Continued.

	Organizations.	Individuals.		Organizations.	Individuals.
Europe—Continued.			Europe—Continued.		
Denmark.....	51	48	Russia.....	217	
France.....	682	702	Servia.....	10	
Germany.....	957	1,233	Spain.....	75	
Great Britain.....	1,012	1,794	Sweden.....	91	
Greece.....	18	17	Switzerland.....	48	
Iceland.....	7	5	Turkey.....	20	
Italy.....	350	312	Polynesia:		
Luxemburg.....	6		Fiji Islands.....	1	
Malta.....	6	1	New Hebrides.....	1	
Montenegro.....	1				
Netherlands.....	104	139	Total correspondents,		
Norway.....	62	61	July 1, 1911, to Jan. 1,		
Portugal.....	36	14	1912.....	5,535	7,
Roumania.....	24	9			

Respectfully submitted.

F. W. TRUE,
*Assistant Secretary in charge
of Library and Exchanges.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 7, 1912.



AMERICAN TAPIR IN THE NATIONAL ZOOLOGICAL PARK.
Received from the Municipal Zoological Garden, Buenos Aires.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report of the operations of the National Zoological Park for the fiscal year ending June 30, 1912.

The general appropriation made by Congress for the improvement and maintenance of the park during that year was \$100,000. The cost of maintenance was \$86,132, being materially increased over that of the previous year mainly because of the advance in prices of forage and other food supplies, the expenditure for which amounted to \$21,175. A few small increases were made in the compensation of employees, but nothing to correspond with the great increase in the cost of living which has occurred during recent years.

ACCESSIONS.

Among these the most important were 2 elephant seals and 4 northern fur seals from the United States Bureau of Fisheries, 8 white pelicans from Lieut. Col. L. M. Brett, acting superintendent of the Yellowstone National Park, and a pair of American tapirs, which, with certain other animals, were received in exchange, as noted below. The accessions included about 25 species not already represented in the collection. Mammals and birds born and hatched numbered 108, and included American tapir, yak, American bison, harnessed antelope, Barasingha deer, llama, mona monkey, hairy armadillo, wild turkey, and Florida cormorant.

EXCHANGES.

The most important accession from this source was a shipment received in November, 1911, from the Municipal Zoological Garden at Buenos Aires, Argentine Republic, which comprised 23 animals and included a pair each of Brazilian tapirs, Patagonian cavies, and Chilean eagles, with other interesting mammals and birds. A sambar deer was received from the New York Zoological Park, and a considerable number of specimens from dealers.

ANIMALS IN THE COLLECTION JUNE 30, 1912.

MAMMALS.

Grivet monkey (<i>Cercopithecus sabaeus</i>)	1	African palm civet (<i>Viverra civetta</i>)	1
Green monkey (<i>Cercopithecus callitrichus</i>)	1	Common genet (<i>Genetta genetta</i>)	2
Mona monkey (<i>Cercopithecus mona</i>)	3	Sudan lion (<i>Felis leo</i>)	2
Diana monkey (<i>Cercopithecus diana</i>)	2	Killimanjaro lion (<i>Felis leo sabakiensis</i>)	5
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	2	Tiger (<i>Felis tigris</i>)	1
Bonnet monkey (<i>Macacus sinicus</i>)	1	Cougar (<i>Felis oregonensis hippolestes</i>)	1
Macaque monkey (<i>Macacus cynomolgus</i>)	4	Jaguar (<i>Felis onca</i>)	1
Pig-tailed monkey (<i>Macacus nemestrinus</i>)	4	Mexican jaguar (<i>Felis onca goldmani</i>)	1
Rhesus monkey (<i>Macacus rhesus</i>)	27	Leopard (<i>Felis pardus</i>)	2
Brown macaque (<i>Macacus arctoides</i>)	3	Black leopard (<i>Felis pardus</i>)	1
Japanese monkey (<i>Macacus fuscatus</i>)	3	Serval (<i>Felis serval</i>)	1
Formosan rock-macaque (<i>Macacus cyclops</i>)	1	Ocelot (<i>Felis pardalis</i>)	1
Chacma (<i>Papio porcarius</i>)	1	Canada lynx (<i>Lynx canadensis</i>)	1
Mandrill (<i>Papio matmon</i>)	4	Bay lynx (<i>Lynx rufus</i>)	5
White-throated capuchin monkey (<i>Cebus hypoleucus</i>)	1	Spotted lynx (<i>Lynx rufus texensis</i>)	2
Brown monkey (<i>Cebus fatuellus</i>)	1	Florida lynx (<i>Lynx rufus floridanus</i>)	1
Marmoset (<i>Haple jacchus</i>)	1	Steller's sea lion (<i>Eumetopias stelleri</i>)	1
Ruffed lemur (<i>Lemur varius</i>)	2	California sea lion (<i>Zalophus californianus</i>)	2
Ring-tailed lemur (<i>Lemur catta</i>)	1	Northern fur seal (<i>Callotaria alascanus</i>)	2
Polar bear (<i>Thalarctos maritimus</i>)	3	Harbor seal (<i>Phoca vitulina</i>)	2
European brown bear (<i>Ursus arctos</i>)	2	Fox squirrel (<i>Sciurus niger</i>)	9
Kadlak bear (<i>Ursus middendorffi</i>)	1	Western fox squirrel (<i>Sciurus ludovicianus</i>)	8
Yakutat bear (<i>Ursus dalli</i>)	1	Gray squirrel (<i>Sciurus carolinensis</i>)	40
Alaskan brown bear (<i>Ursus gyas</i>)	3	Black squirrel (<i>Sciurus carolinensis</i>)	20
Hybrid bear (<i>Ursus gyas-arctos</i>)	1	Albino squirrel (<i>Sciurus carolinensis</i>)	1
Kidder's bear (<i>Ursus kidderi</i>)	2	Panama squirrel	1
Himalayan bear (<i>Ursus tibetanus</i>)	1	Prairie dog (<i>Cynomys ludovicianus</i>)	25
Grizzly bear (<i>Ursus horribilis</i>)	4	Woodchuck (<i>Arctomys monax</i>)	7
Black bear (<i>Ursus americanus</i>)	9	Albino woodchuck (<i>Arctomys monax</i>)	1
Cinnamon bear (<i>Ursus americanus</i>)	3	Black woodchuck (<i>Arctomys monax</i>)	1
Sloth bear (<i>Melursus ursinus</i>)	1	Alpine marmot (<i>Arctomys marmotta</i>)	3
Kinkajou (<i>Cercoptes caudivolvulus</i>)	1	American beaver (<i>Castor canadensis</i>)	3
Cacomistle (<i>Bassariscus astuta</i>)	1	Coypu (<i>Myocastor coypus</i>)	2
Gray coatimundi (<i>Nasua narica</i>)	8	Hutia-conga (<i>Capromys pilorides</i>)	2
Raccoon (<i>Procyon lotor</i>)	17	Indian porcupine (<i>Hystrix leucura</i>)	2
American badger (<i>Taxidea americana</i>)	3	Mexican agouti (<i>Dasyprocta mexicana</i>)	1
Common skunk (<i>Mephitis mephitis</i>)	1	Azara's agouti (<i>Dasyprocta azarae</i>)	2
American marten (<i>Mustela americana</i>)	3	Crested agouti (<i>Dasyprocta cristata</i>)	2
Fisher (<i>Mustela pennantii</i>)	1	Hairy-rumped agouti (<i>Dasyprocta prymnolopha</i>)	4
Mink (<i>Putorius vison</i>)	5	Paca (<i>Calogenys paca</i>)	2
Common ferret (<i>Putorius putorius</i>)	1	Guinea pig (<i>Cavia cutleri</i>)	13
Black-footed ferret (<i>Putorius nigripes</i>)	2	Patagonian cavy (<i>Dolichotis patagonica</i>)	3
North American otter (<i>Lutra canadensis</i>)	5	Domestic rabbit (<i>Lepus cuniculus</i>)	37
Esquimo dog (<i>Canis familiaris</i>)	2	Cape hyrax (<i>Procavia capensis</i>)	1
Dingo (<i>Canis dingo</i>)	2	Indian elephant (<i>Elephas maximus</i>)	1
Gray wolf (<i>Canis occidentalis</i>)	4	Brazilian tapir (<i>Tapirus americanus</i>)	4
Black wolf (<i>Canis occidentalis</i>)	1	Grevy's zebra (<i>Equus grevyi</i>)	1
Coyote (<i>Canis latrans</i>)	4	Zebra-donkey hybrid (<i>Equus grevyi-asinus</i>)	1
Woodhouse's coyote (<i>Canis frustror</i>)	3	Grant's zebra (<i>Equus burchelli granti</i>)	1
Crab-eating dog (<i>Canis cancrivorus</i>)	1	Collared peccary (<i>Dicotyles angulatus</i>)	6
Red fox (<i>Vulpes pennsylvanicus</i>)	4	Wild boar (<i>Sus scrofa</i>)	2
Swift fox (<i>Vulpes velox</i>)	2	Northern wart hog (<i>Phacochærus africanus</i>)	2
Arctic fox (<i>Vulpes lagopus</i>)	2	Hippopotamus (<i>Hippopotamus amphibius</i>)	1
Gray fox (<i>Urocyon cinereo-argenteus</i>)	5		
Striped hyena (<i>Hyæna striata</i>)	1		

Animals in the collection June 30, 1912—Continued.

MAMMALS—Continued.

Guanaco (<i>Lama huanachus</i>)	3	Indian antelope (<i>Antelope cervicapra</i>)	3
Llama (<i>Lama glama</i>)	8	Nilgai (<i>Boselaphus tragocamelus</i>)	2
Alpaca (<i>Lama pacos</i>)	2	Congo harnessed antelope (<i>Tragelaphus gratus</i>)	2
Vicugna (<i>Lama vicugna</i>)	2	East African eland (<i>Oreos canna patersonianus</i>)	1
Bactrian camel (<i>Camelus bactrianus</i>)	3	Chamois (<i>Rupicapra tragus</i>)	2
Muntjac (<i>Cervulus muntjac</i>)	1	Tahr (<i>Hemitragus jemlatous</i>)	7
Sambar deer (<i>Cervus aristotelis</i>)	2	Common goat (<i>Capra hircus</i>)	8
Philippine deer (<i>Cervus philippinus</i>)	1	Angora goat (<i>Capra hircus</i>)	5
Hog deer (<i>Cervus porcinus</i>)	6	Barbary sheep (<i>Ovis tragelaphus</i>)	12
Barasingha deer (<i>Cervus duvaucelli</i>)	10	Barbados sheep (<i>Ovis aries-tragelaphus</i>)	13
Axis deer (<i>Cervus axis</i>)	6	Anoa (<i>Anoa depressicornis</i>)	1
Japanese deer (<i>Cervus sika</i>)	10	East African buffalo (<i>Buffelus neu-manni</i>)	1
Red deer (<i>Cervus elaphus</i>)	6	Zebu (<i>Bidos indicus</i>)	3
American elk (<i>Cervus canadensis</i>)	7	Yak (<i>Poephagus grunniens</i>)	3
Fallow deer (<i>Cervus dama</i>)	6	American bison (<i>Bison americanus</i>)	14
Reindeer (<i>Rangifer tarandus</i>)	1	Hairy armadillo (<i>Dasypus villosus</i>)	3
Virginia deer (<i>Odocoileus virginianus</i>)	9	Wallaroo (<i>Macropus robustus</i>)	2
Mule deer (<i>Odocoileus hemionus</i>)	1	Bennett's wallaby (<i>Macropus ruficollis bennettii</i>)	1
Columbian black-tailed deer (<i>Odocoileus columbianus</i>)	1	Virginia opossum (<i>Didelphys marsupialis</i>)	2
Cuban deer (<i>Odocoileus sp.</i>)	1	Common wombat (<i>Phascologymys mitchellii</i>)	1
Prong-horn antelope (<i>Antilocapra americana</i>)	1		
Coke's hartebeest (<i>Bubalis cokei</i>)	2		
Bontebok (<i>Damalescus pygargus</i>)	1		
Blessbok (<i>Damalescus albifrons</i>)	1		
White-tailed gnu (<i>Connochates gnu</i>)	1		
Defassa water buck (<i>Cobus defassa</i>)	1		

BIRDS.

European blackbird (<i>Merula merula</i>)	1	Red-crested cardinal (<i>Paroaria cuculata</i>)	10
Brown thrasher (<i>Toxostoma rufum</i>)	1	Common cardinal (<i>Cardinalis cardinalis</i>)	1
Japanese robin (<i>Liothris luteus</i>)	12	Siskin (<i>Spinus spinus</i>)	8
White-cheeked bulbul (<i>Pyononotus leucogenys</i>)	5	European goldfinch (<i>Carduelis elegans</i>)	3
Black bulbul (<i>Pyononotus pygæus</i>)	3	Yellow hammer (<i>Emberiza citrinella</i>)	1
Laughing thrush (<i>Garrulus leucolophus</i>)	2	Common canary (<i>Serinus canarius</i>)	15
Bishop finch (<i>Tanagra episcopus</i>)	4	Linnet (<i>Linota cannabina</i>)	4
Orange-checked waxbill (<i>Estrelida mel-poda</i>)	6	Bullfinch (<i>Pyrrhula europæa</i>)	10
Amaduvade finch (<i>Estrelida amandava</i>)	4	Hooded oriole (<i>Icterus cucullatus</i>)	3
Cordon-bleu (<i>Estrelida phœnicotis</i>)	8	Cowbird (<i>Molothrus ater</i>)	1
Magpie finch (<i>Spermestes fringilloides</i>)	10	Glossy starling (<i>Lamprotonis caudatus</i>)	1
Cut-throat finch (<i>Amadina fasciata</i>)	11	European raven (<i>Corvus corax</i>)	1
Zebra finch (<i>Amadina castanotis</i>)	4	American raven (<i>Corvus corax sinuatus</i>)	1
Black-headed finch (<i>Munia atricapilla</i>)	11	Common crow (<i>Corvus brachyrhynchos</i>)	2
Three-colored finch (<i>Munia malacca</i>)	7	Green jay (<i>Xanthoura luzuosa</i>)	1
White-headed finch (<i>Munia maja</i>)	9	White-throated jay (<i>Garrulus leucotis</i>)	2
Nutmeg finch (<i>Munia punctularia</i>)	6	Blue jay (<i>Cyanocitta cristata</i>)	3
Java sparrow (<i>Munia oryzivora</i>)	14	American magpie (<i>Pica pica hudsonica</i>)	1
White Java sparrow (<i>Munia cryzivora</i>)	15	Red-billed magpie (<i>Urociæsa oocyp-talis</i>)	2
Chestnut-breasted finch (<i>Donacolia castaneothorax</i>)	10	Piping crow (<i>Gymnorhina tibicen</i>)	2
Parson finch (<i>Poephila cincta</i>)	1	Yellow tyrant (<i>Pitangus derbianus</i>)	2
Lady Gould's finch (<i>Poephila gouldiæ</i>)	1	Giant kingfisher (<i>Dacelo gigas</i>)	1
Bearded finch (<i>Spermophila sp.</i>)	2	Yellow-breasted toucan (<i>Ramphastos carinatus</i>)	3
Napoleon weaver (<i>Pyromelana afra</i>)	4	Sulphur-crested cockatoo (<i>Cacatus galerita</i>)	3
Madagascar weaver (<i>Fondia madagascariensis</i>)	8		
Red-billed weaver (<i>Quelea quelea</i>)	8		
Whydah weaver (<i>Vidua paradisæa</i>)	16		
Painted bunting (<i>Passerina ciris</i>)	1		

Animals in the collection June 30, 1912—Continued.

BIRDS—Continued.

White cockatoo (<i>Cacatua alba</i>)-----	6	South American condor (<i>Saroorhamphus gryphus</i>)-----	
Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)-----	1	California condor (<i>Gymnogyps californianus</i>)-----	2
Bare-eyed cockatoo (<i>Cacatua gymnops</i>)--	2	Griffon vulture (<i>Gyps fulvus</i>)-----	3
Roseate cockatoo (<i>Cacatua roseicapilla</i>)-----	3	Cinereous vulture (<i>Vultur monachus</i>)--	1
Gang-gang cockatoo (<i>Callocephalon galeatum</i>)-----	1	Egyptian vulture (<i>Neophron percnopterus</i>)-----	2
Yellow and blue macaw (<i>Ara ararauna</i>)-----	2	Turkey vulture (<i>Cathartes aura</i>)-----	3
Red and yellow and blue macaw (<i>Ara macao</i>)-----	3	Black vulture (<i>Cathartida urub</i>)-----	1
Red and blue macaw (<i>Ara chloroptera</i>)-----	3	King vulture (<i>Gypagus papa</i>)-----	2
Great green macaw (<i>Ara militaris</i>)-----	1	Ring dove (<i>Columba palumbus</i>)-----	3
Kea (<i>Nestor notabilis</i>)-----	1	Snow pigeon (<i>Columba leuconota</i>)-----	1
Mexican conure (<i>Conurus holochlorus</i>)--	1	Red-billed pigeon (<i>Columba flaviventris</i>)-----	2
Carolina parakeet (<i>Conuropsis carolinensis</i>)-----	2	Mourning dove (<i>Zenaidura macroura</i>)--	2
Cuban parrot (<i>Amazona leucocephala</i>)--	2	Peaceful dove (<i>Geopelia tranquilla</i>)--	2
Orange-winged amazon (<i>Amazona amazonica</i>)-----	3	Cape dove (<i>Cena capensis</i>)-----	2
Porto Rican amazon (<i>Amazona vittata</i>)-----	1	Blood-breasted pigeon (<i>Phlogothanas luconica</i>)-----	3
Yellow-shouldered amazon (<i>Amazona ochroptera</i>)-----	2	Victoria crowned pigeon (<i>Goura victoria</i>)-----	1
Yellow-fronted amazon (<i>Amazona ochrocephala</i>)-----	2	Purplish guan (<i>Penelope purpurascens</i>)-----	1
Yellow-headed amazon (<i>Amazona leucillanti</i>)-----	1	Created curassow (<i>Craza alector</i>)-----	2
Blue-fronted amazon (<i>Amazona aestiva</i>)-----	1	Mexican curassow (<i>Craza globicera</i>)--	2
Lesser vasa parrot (<i>Coracopsis nigra</i>)--	4	Chapman's curassow (<i>Craza chapmani</i>)--	2
Banded parakeet (<i>Palæornis fasciata</i>)--	2	Daubenton's curassow (<i>Craza daubentoni</i>)-----	1
Rosella parakeet (<i>Platycercus eximius</i>)-----	3	Wild turkey (<i>Meleagris gallopavo silvestris</i>)-----	1
Love bird (<i>Agapornis pullaria</i>)-----	2	Peafowl (<i>Pavo cristata</i>)-----	1
Green parakeet (<i>Loriculus sp.</i>)-----	2	Jungle fowl (<i>Gallus bankiva</i>)-----	4
Shell parakeet (<i>Melospettacus undulatus</i>)-----	1	Reeves's pheasant (<i>Phasianus reevesi</i>)--	2
Great horned owl (<i>Bubo virginianus</i>)--	12	Golden pheasant (<i>Thaumalea picta</i>)-----	3
Arctic horned owl (<i>Bubo virginianus subarcticus</i>)-----	1	Silver pheasant (<i>Euplocamus nycthemerus</i>)-----	2
Screech owl (<i>Otus asio</i>)-----	2	European quail (<i>Coturnix communis</i>)--	2
Barred owl (<i>Strix varia</i>)-----	2	Hungarian partridge (<i>Perdix perdix</i>)--	1
Sparrow hawk (<i>Falco sparverius</i>)-----	2	Bobwhite (<i>Colinus virginianus</i>)-----	1
Bald eagle (<i>Haliaeetus leucocephalus</i>)--	8	Mountain quail (<i>Oreortyx picta</i>)-----	1
Alaskan bald eagle (<i>Haliaeetus leucocephalus alascanus</i>)-----	1	Scaled quail (<i>Callipepla squamata</i>)-----	2
Golden eagle (<i>Aquila chrysaetos</i>)-----	1	California quail (<i>Lophortyx californica</i>)--	2
Short-tailed eagle (<i>Terathopus ecaudatus</i>)-----	1	Massena quail (<i>Cyrtonyx montezumae</i>)--	2
Harpy eagle (<i>Thrasaetus harpyia</i>)-----	1	Purple gallinule (<i>Porphyrio carulea</i>)--	2
Chilian eagle (<i>Geranoaetus melanoleucus</i>)-----	1	Black-backed gallinule (<i>Porphyrio melanotos</i>)-----	8
Crowned hawk eagle (<i>Spizaetus coronatus</i>)-----	1	Martinique gallinule (<i>Tronornis martinicus</i>)-----	1
Red-tailed hawk (<i>Buteo borealis</i>)-----	1	American coot (<i>Fulica americana</i>)-----	1
Broad-winged hawk (<i>Buteo platypterus</i>)-----	1	Flightless rail (<i>Ocydromus australis</i>)--	1
Venezuelan hawk-----	1	Common carlama (<i>Carlama cristata</i>)--	1
Caracara (<i>Polyborus cheriway</i>)-----	3	Demoiselle crane (<i>Anthropoides virgo</i>)--	1
Lammergeyer (<i>Gypaetus barbatus</i>)-----	1	Crowned crane (<i>Balearia pavonina</i>)-----	1
		Sandhill crane (<i>Grus mexicana</i>)-----	1
		Australian crane (<i>Grus australasiana</i>)--	1
		European crane (<i>Grus cinerea</i>)-----	1
		Sarus crane (<i>Grus antigone</i>)-----	1
		Indian white crane (<i>Grus leucogeranus</i>)--	1
		Thick-knee (<i>Edicnemus gallinarius</i>)-----	1
		Ruff (<i>Machetes pugnax</i>)-----	1
		Black-crowned night heron (<i>Nycticorax nycticorax naevius</i>)-----	1

Animals in the collection June 30, 1912—Continued.

BIRDS—Continued.

Little blue heron (<i>Florida carulea</i>)----	1	Lesser snow goose (<i>Chen hyperboreus</i>)----	2
Reddish egret (<i>Dichromanassa rufescens</i>)-----	3	Greater snow goose (<i>Chen hyperboreus nivalis</i>)-----	1
Snowy egret (<i>Egretta candidissima</i>)----	4	American white-fronted goose (<i>Anser albifrons gambeli</i>)-----	4
Great white heron (<i>Herodias egretta</i>)----	1	Chinese goose (<i>Anser cygnoides</i>)-----	3
Great blue heron (<i>Ardea herodias</i>)-----	3	Red-headed duck (<i>Marila americana</i>)----	1
Great black-crowned heron (<i>Ardea coccyz</i>)-----	1	Wood duck (<i>Aix sponsa</i>)-----	8
Boat-bill (<i>Camocroma cochlearia</i>)-----	2	Mandarin duck (<i>Dendronessa galericulata</i>)-----	5
Blittern (<i>Botaurus lentiginosus</i>)-----	1	Pintail (<i>Dasila acuta</i>)-----	4
Black stork (<i>Ciconia nigra</i>)-----	1	Shoveler duck (<i>Spatula clypeata</i>)-----	2
White stork (<i>Ciconia ciconia</i>)-----	1	Black duck (<i>Anas rubripes</i>)-----	1
Marabou stork (<i>Leptoptilus dubius</i>)-----	1	Mallard (<i>Anas platyrhynchos</i>)-----	13
Wood ibis (<i>Mycteria americana</i>)-----	2	American white pelican (<i>Pelecanus erythrorhynchos</i>)-----	10
Sacred ibis (<i>Ibis aethiopica</i>)-----	4	European white pelican (<i>Pelecanus onocrotalus</i>)-----	1
White ibis (<i>Guara alba</i>)-----	22	Roseate pelican (<i>Pelecanus roseus</i>)-----	1
Roseate spoonbill (<i>Ajaja ajaja</i>)-----	1	Brown pelican (<i>Pelecanus occidentalis</i>)-----	5
European flamingo (<i>Phaenicopterus antiquorum</i>)-----	5	Black-backed gull (<i>Larus marinus</i>)----	1
Crested screamer (<i>Chauna cristata</i>)----	3	Herring gull (<i>Larus argentatus</i>)-----	4
Trumpeter swan (<i>Olor buccinator</i>)-----	1	American herring gull (<i>Larus argentatus smithsonianus</i>)-----	6
Whistling swan (<i>Olor columbianus</i>)-----	3	Laughing gull (<i>Larus atrifrons</i>)-----	3
Mute swan (<i>Cygnus gibbus</i>)-----	2	Florida cormorant (<i>Phalacrocorax auritus floridanus</i>)-----	12
Black swan (<i>Chenopsis atrata</i>)-----	2	Mexican cormorant (<i>Phalacrocorax nigra mexicana</i>)-----	1
Muscovy duck (<i>Cairina moschata</i>)-----	1	Water turkey (<i>Anhinga anhinga</i>)-----	5
White muscovy duck (<i>Cairina moschata</i>)-----	2	Small ostrich (<i>Struthio molybdophanes</i>)-----	1
Wandering tree-duck (<i>Dendrocygna arcuata</i>)-----	7	Common cassowary (<i>Casuarus galeatus</i>)-----	1
Fulvous tree-duck (<i>Dendrocygna bicolor</i>)-----	2	Common rhea (<i>Rhea americana</i>)-----	3
Egyptian goose (<i>Chenelopex aegyptiacus</i>)-----	1	Emu (<i>Dromæus nova hollandia</i>)-----	1
Brant (<i>Branta bernicla glaucogastra</i>)-----	1		
Canada goose (<i>Branta canadensis</i>)-----	8		
Hutchin's goose (<i>Branta canadensis hutchinsii</i>)-----	3		

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)----	18	Black snake (<i>Zamenis constrictor</i>)-----	1
Painted turtle (<i>Chrysemys picta</i>)-----	4	Coach-whip snake (<i>Zamenis flagellum</i>)----	1
Diamond-back terrapin (<i>Malacoclemys palustris</i>)-----	1	Corn snake (<i>Coluber guttatus</i>)-----	1
Three-toed box-tortoise (<i>Cistudo triunguis</i>)-----	6	Common chicken snake (<i>Coluber quadrivittatus</i>)-----	2
Painted box-tortoise (<i>Cistudo ornata</i>)----	4	Gopher snake (<i>Compsosoma coralae cooperi</i>)-----	4
Gopher turtle (<i>Xerobates polyphemus</i>)-----	1	Pine snake (<i>Pityophis melanoleucus</i>)-----	6
Duncan Island tortoise (<i>Testudo ephippium</i>)-----	2	Bull snake (<i>Pityophis sayi</i>)-----	1
Albemarle Island tortoise (<i>Testudo vicina</i>)-----	1	Texas chicken snake (<i>Ophidolus calligaster</i>)-----	2
Alligator lizard (<i>Sceloporus undulatus</i>)----	1	King snake (<i>Ophibolus getulus</i>)-----	1
Horned lizard (<i>Phrynosoma cornutum</i>)-----	1	Common garter snake (<i>Eutania aitalis</i>)-----	1
Gila monster (<i>Heloderma suspectum</i>)-----	5	Texas water snake (<i>Eutania proxima</i>)-----	1
Glass snake (<i>Ophisaurus ventralis</i>)-----	1	Water moccasin (<i>Ancistronodon pictoratus</i>)-----	1
Anaconda (<i>Eunectes murinus</i>)-----	2	Copperhead (<i>Ancistronodon contortrix</i>)-----	5
Common boa (<i>Boa constrictor</i>)-----	1	Diamond rattlesnake (<i>Crotalus adamanteus</i>)-----	3
Antillean boa (<i>Boa diviniroqua</i>)-----	1	Banded rattlesnake (<i>Crotalus horridus</i>)-----	1
Cuban tree-boa (<i>Epicrates angulifer</i>)-----	3		
Spreading adder (<i>Heterodon platyrhinus</i>)-----	1		

GIFTS.

The following persons presented animals to the park during the year:

Miss Frances Gage Allison, New Bedford, Mass., a Diana monkey.
 Mrs. J. B. Ames, Winchester, Va., an albino squirrel.
 Mr. D. R. Anthony, jr., Washington, D. C., an alligator.
 Mr. Oscar E. Baynard, Washington, D. C., a black vulture.
 Mr. August Busck, Washington, D. C., a Panama squirrel.
 Maj. H. W. Carpenter, U. S. M. C., ret., Berryville, Va., two Cuban parrots.
 Mr. J. R. Eddy, Lamedeer, Mont., a western porcupine.
 Dr. Chas. W. Ely, Frederick, Md., a barred owl.
 Mr. W. H. Emery, jr., Washington, D. C., an alligator.
 Mr. Victor J. Evans, Washington, D. C., two marmosettes.
 Mr. Wallace Evans, Oak Park, Ill., a mink.
 Mr. Gale, Washington, D. C., a horned lizard.
 Mr. W. S. Groh, Ashburn, Va., a common raccoon.
 Mr. John B. Henderson, jr., Washington, D. C., two common canaries.
 Mr. Holmes, Washington, D. C., a common opossum.
 Mrs. Kenrolde, Washington, D. C., a woodchuck.
 Mr. W. P. Mattoon, Washington, D. C., a "glass snake."
 Mr. F. A. Milligan, Washington, D. C., a common canary.
 Mr. Russell H. Millward, New York City, a paca.
 Mr. J. L. Narvell, Port Deposit, Md., two copperhead snakes.
 Mr. O. Schneider, Washington, D. C., two alligators.
 Messrs. D. A. Smith & L. E. Deaton, Walhalla, S. C., a bittern.
 Mr. S. Stansberg, Baltimore, Md., an alligator.
 Mr. F. B. Travis, Washington, D. C., a common rabbit.
 Master Horace Wadsworth, Washington, D. C., a love bird.
 Mrs. L. P. Wadsworth, Washington, D. C., two alligators.
 Mr. George A. Wise, Washington, D. C., a woodchuck.
 Mr. Thomas Zipp, Baltimore, Md., seven copperhead snakes.
 United States Bureau of Fisheries, two elephant seals and four northern fur seals.
 The Janitor, Balfour Apt., Washington, D. C., a sparrow hawk.
 Unknown donors, a barn owl and two alligators.

LOSSES OF ANIMALS.

The most important losses were a lion, wolverine, reindeer, and two northern fur seals from enteritis; a pair of elephant seals and a fur seal from pneumonia; four prong-horn antelopes from malignant catarrh of nose and throat, and an Alaskan brown bear and a springbok from tuberculosis. A female tiger was killed because of abnormal development of its shoulder. Quail disease was introduced through a shipment of birds from the West, but was isolated so that very little loss was occasioned. Dead animals to the number of 199 specimens were transferred to the National Museum. Autopsies were made as formerly by the Pathological Division of the Bureau of Animal Industry, Department of Agriculture.¹

¹ The causes of death were reported to be as follows: Enteritis, 24; gastritis, gastro-enteritis, 9; enteritis from round worms, 4; intestinal coccidiosis, 4; quail disease,

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented	50
Received from Yellowstone National Park	8
Received in exchange	75
Gift	35
Purchased	234
Born and hatched in National Zoological Park	108
Total	510

SUMMARY.

Animals on hand July 1, 1911	1,414
Accessions during the year	510
Total	1,924
educt loss (by exchange, death, and returning of animals)	373
On hand June 30, 1912	1,551

Class.	Species.	Individuals.
Animals	150	591
Birds	199	876
Reptiles	32	84
Total	381	1,551

VISITORS.

The number of visitors to the park during the year is estimated at 542,738, being a daily average of 1,487. The largest number in any one month was 95,485, in April, 1912, an average per day of 3,183.

During the year there visited the park 142 schools and classes, a total of 4,140 pupils, being a monthly average of 345. Besides those from the District of Columbia and neighboring States there were classes from Vermont, Massachusetts, New York, and Tennessee.

IMPROVEMENTS.

The amount remaining from the appropriation after providing for maintenance, was used mainly for improvements of a permanent character. The most important of these, and one urgently needed,

; congestion of lungs, 19; pneumonia, 13; tuberculosis, 13; pulmonary edema, 2; urulent inflammation of lungs, 1; aspergillosis, 2; abscess, 5; malignant catarrh of nose and throat, 4; catarrh of nostrils, 1; congestion of liver, 5; necrosis of liver, 2; cancer of the liver, 1; osteomalacia, 2; necrosis of tail, 1; pericarditis, 1; peritonitis, 1; lepticemia, 1; pyemic absorption, 1; hypertrophy of spleen, 1; impaction of intestine, 1; tympanitic colic, 1; rupture of egg in oviduct, 1; stomach worms, 1; subcutaneous paratuberculosis, 1; rabies, 1; congelation, 2; starvation (snakes), 6; no cause found, 6; accident fighting, killed by wild animals, etc.), 19.

was a fireproof building for the central heating plant. From the plant the animal houses and the workshop are heated, and as long as the boilers were housed in a flimsy, wooden shed, part of which was used as a woodworking shop, there was serious risk of a disastrous fire. The new building is 46 feet by 56 feet, with walls of stone and concrete, and a roof of slate on concrete slabs, supported by steel roof framing. Two additional boilers were purchased and installed so that by using the boilers in alternation they may be cleaned and repaired whenever necessary without interrupting the operation of the plant. The storage vault for coal was enlarged, and a large concrete storage tank built for supplying warmed water to the tanks for the hippopotamus, tapirs, and alligators. The cost of the house, boilers, and other improvements connected with them, was \$5,850.

The series of yards on the west side of the antelope house was enlarged during the year. Light steel bars replaced the wire of the former fence, and wherever sufficient space was available, a double fence of the same character was used instead of solid partitions.

Adjoining the indoor quarters of the hippopotamus and the tapir a yard 34 feet by 60 feet was constructed, in which was provided a good-sized bathing pool 6 feet deep.

Outdoor cages were installed along the east side of the small mammal house, completing the cage equipment of that building.

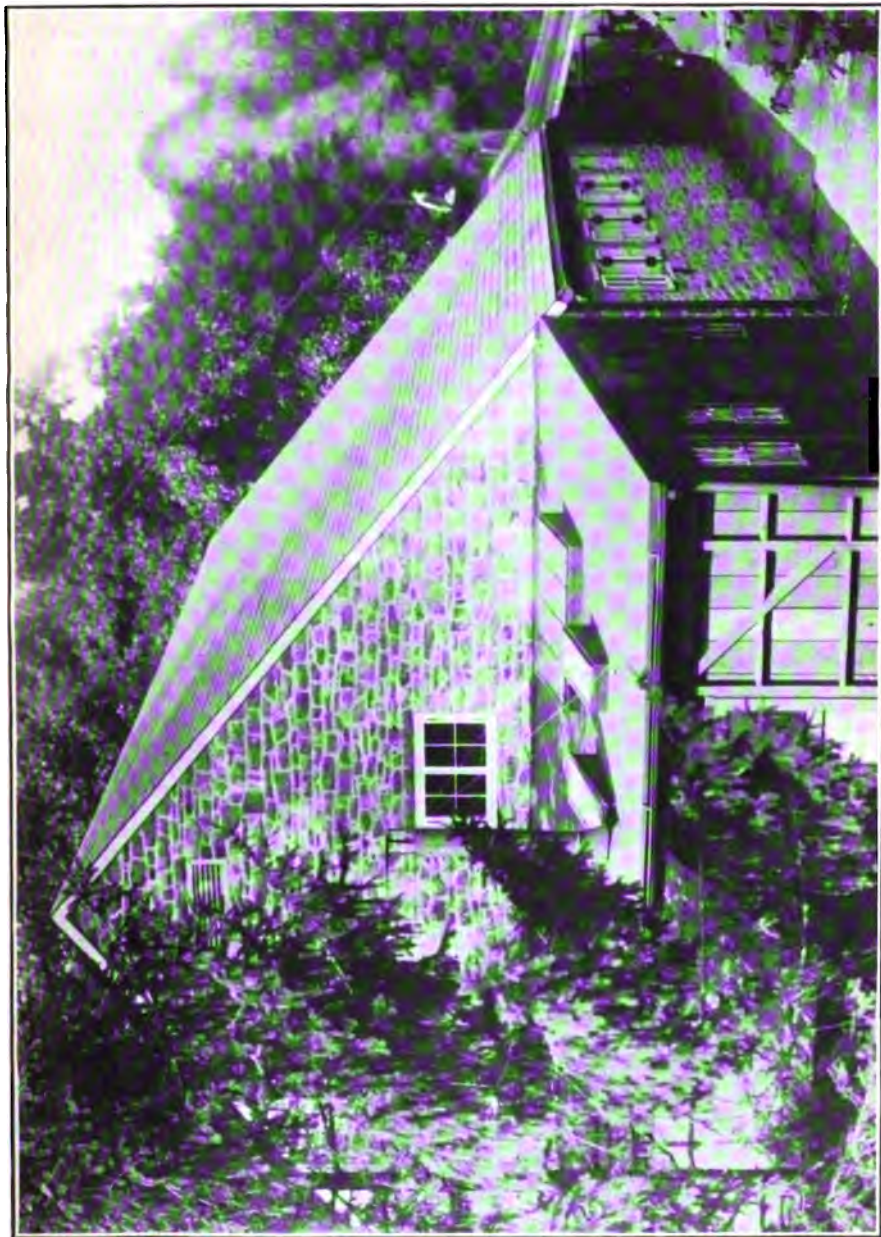
A number of inclosures for cattle, deer, and other animals were rebuilt during the year, and a substantial new shelter constructed for the zebus, vicuñas, and alpacas.

Three small inclosures for semiaquatic animals were built near the otter and beaver yards, and a permanent walk constructed from the point to connect with the main walk to the west entrance.

The machines in the workshops of the park have heretofore been operated by steam power. As electric power can now be had, an arrangement is being made to equip for its use as rapidly as is practicable. Two motors were purchased near the close of the year, and a circular saw with combination bench. Considerable economy in labor will be effected by these changes. Work was also begun on a small house for the storage and preparation of food.

The cost of these improvements was as follows:

House for central heating plant.....	\$5,850
Yards on west side of antelope house.....	1,000
Yard for hippopotamus and tapirs.....	500
Completing outdoor cages at small mammal house.....	500
Inclosures and shelters for cattle, deer, etc.....	500
Small inclosures and walk in beaver valley.....	400
Equipment for workshops.....	0
Beginning construction of food house.....	500
Total.....	11,250



NEW STONE BOILER HOUSE, AND MACHINE SHOP IN THE NATIONAL ZOOLOGICAL PARK.

IMPORTANT NEEDS.

New bridge.—The log bridge that crosses the creek on the main driveway in the lower part of the park has for some time shown signs of weakness. A careful examination, by the engineer of bridges of the District of Columbia, showed that several of the logs were in an advanced stage of decay and that the whole structure would soon be unsafe. It was therefore recommended to Congress that an appropriation of \$20,000 be made for a permanent structure. At the time of writing it is known that such an appropriation was made. The construction of the new bridge will therefore be part of the work for the coming year.

Aviary.—In spite of all efforts the fine collections of birds in the park is very far from adequately housed. The wooden building in which the larger number are kept is too small, too low, insanitary and really unworthy of a national institution. It was built in the cheapest manner to meet an emergency and although considerable sums have been spent on it for repairs it is far from satisfactory. It is desired to build a suitable aviary in the western part of the park and to group about this the cages for the eagles, vultures, condors and owls now scattered somewhat irregularly about the grounds. It is believed that a suitable structure can be built for about \$80,000.

Hospital.—The statistics given above show that the animals are not exempt from diseases. Infective disorders are sometimes brought on by animals that have been kept in insanitary conditions on ship-board or in the collections of dealers. Even with the utmost care pathological conditions are likely to arise due to changes of habit due to captivity. Animals brought to the park from any place not known to be sanitary and free from disease should be properly quarantined. Sick animals should also be isolated, both on their own account and to prevent the spread of disease. This has been done imperfectly, in the only way possible, by keeping them in exposed cages back of the stable and excluding the public. A small building to serve as quarantine and hospital is urgently needed.

Public comfort house.—There is at present no satisfactory provision for the comfort of visitors who come to spend some time in viewing the collection. The park is located at a long distance from any available restaurant, there is no suitable place where women or children can rest, or be quiet if fatigued, or taken suddenly ill. This offers an unpleasant contrast to the arrangements usually seen in other zoological gardens. It is desired to construct a permanent building in a central locality to serve as a rest house and refectory.

New paddocks.—The deer and other ruminant animals confined near the western entrance to the park have worn the ground so much by the constant attrition of their hoofs that their paddocks are almost

wholly bare of vegetation and the soil is washing away under the influence of rains. These animals must soon be removed to a new location.

Alterations of area.—Very soon after the inception of the park endeavors were made to have its boundaries changed to conform to the plan of the city. It must be remembered that this plan was not developed when the park was laid out. Consequently there are regions where the boundary does not reach existing streets and narrow strips of ground are left which, if occupied, make the rear of houses abut upon the park, presenting an unsightly appearance. This has gone on until on the eastern side private houses have been built that seem to be about to slide down a steep cliff into the park. The value of the adjoining property has materially enhanced.

The western side is greatly in need of improvement. The ideal plan would be to extend the park to Connecticut Avenue, which is a fine, broad street, and make the principal entrance there, with gateways befitting a national institution. If this be found to involve too great an expenditure, the area should at least be made to reach to some contiguous road, either now existing or to be hereafter established.

Retaining wall.—The extension of a street a short distance from the southern boundary of the park has made necessary an extensive fill of earth across the ravine where Ontario Road reaches the park boundary. This fill is encroaching more and more upon the park and after every heavy rain tons of earth are precipitated down the ravine and into the creek. There seems to be no remedy for this but the construction of a suitable retaining wall or walls forming series of terraces.

Riprapping banks of Rock Creek.—The heavy volume of water that rushes down the creek at every storm erodes the banks, undermines large trees, and in some places threatens the roadways. It is desirable to avoid this by riprapping with stones of sufficient size to withstand the action of the water. Such work can be effectually concealed by planting twigs and small plants in the interstices.

Footbridge below lower ford.—As the city is rapidly increasing to the westward of the park, more and more people enter from Cathedral Avenue. There is a well-made road from this entrance to the ford through the creek, practicable during low water for carriage and foot passengers are, however, placed at a disadvantage, as in order to reach the animal houses they are obliged to scramble along a precipitous pathway, used at present mainly by workmen, before they can get to the properly improved roads. At a slight expense a footbridge could be made below the lower ford which would enable visitors to reach at once the main roads of the park.

Additions to the collection.—Without attempting to exhibit those animals that are valuable merely because of their variety, it would

seem that a national collection should at least show those that are common objects of interest, such as the giraffe, the dromedary, the rhinoceros, the African elephant, the various mountain goats, including the indigenous species and others. The high price of these animals has made their acquisition prohibitive in the past, but it is hoped their purchase may be made possible in the future.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1912:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, California, upon a leased plat of ground 100 feet square in horizontal projection are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

There were no important additions to the instrument equipment of the observatory during the year.

In 1909 the Smithsonian Institution, at the expense of the Hodge fund, erected on the summit of Mount Whitney, California (height 14,502 feet), a stone and steel house to shelter observers who might apply to the Institution for the use of the house to promote investigations in any branch of science. While this structure is not the actual property of the Astrophysical Observatory, it affords an excellent opportunity for observations in connection with those taken on Mount Wilson.

WORK OF THE YEAR.

1. ON THE VARIABILITY OF THE SUN.

Congress having provided funds, an expedition under the immediate charge of the director proceeded in July to Bassour, Algeria to make there a long series of solar-constant observations simultaneously with similar observations made by Assistant Aldrich on Mount Wilson. The Algerian expedition included Mr. and Mrs. Abbot and Prof. F. P. Brackett, of Pomona College, California. The apparatus carried was the same used by Mr. Abbot on Mount Whitney in 1909.

and 1910. Station was reached on July 31, 1911, but owing to a most unfortunate miscarriage of a box of apparatus, observations could not be commenced until August 26, and several more days were required to get the whole outfit working satisfactorily. The weather of August was excellent at both Mount Wilson and Bassour, but in the subsequent months the good days at one station frequently coincided with bad ones at the other. Hence, although 44 days of solar-constant observations were secured at Bassour up to November 17, when the camp was broken up, and a still greater number were secured at Mount Wilson, only 29 of these coincided.

In spite of the loss of August and the unfavorable weather of subsequent months, the results thus far reduced strongly confirm the supposed variability of the sun. For example, the first half of September yielded the following results:

Solar constant values.

	Aug. 29.	Aug. 30.	Aug. 31.	Sept. 1.	Sept. 2.	Sept. 3.	Sept. 4.	Sept. 5.	Sept. 6.	Sept. 7.
Mount Wilson	1.913	1.890	1.912	.....	.....	1.894	1.872	1.866	1.935	1.904
Bassour.....	1.976	1.952	1.945	1.930	1.933	1.966	1.905	.....	.....	1.916
B.-W. ....	.063	.062	.033	.....	.....	.072	.033	.....	.....	.012

	Sept. 8.	Sept. 9.	Sept. 10.	Sept. 11.	Sept. 12.	Sept. 13.	Sept. 14.	Sept. 15.	Sept. 16.
Mount Wilson	1.960	1.945	1.872	1.835	1.866	.....	1.885	1.867	1.890
Bassour.....	.....	2.015	1.860	.....	1.905	1.895	.....	1.885	.....
B.-W. ....	.....	.070	-.012	.....	.040	.....	.....	.018	.....

From these results appear:

(A) The solar constant results obtained at Bassour are on the average 2 per cent higher than those obtained for the same days on Mount Wilson. Referring to former reports, the solar constant results obtained at Washington and at Mount Whitney were also consistently higher than those obtained at Mount Wilson, and by about the same amount as just given. Hence, we seem justified in considering that there is a condition tending to low results prevailing at Mount Wilson. This may very probably be the increase of haziness there at high sun, due to increased humidity. In view of the uniform testimony of the three other stations, it seems proper to conclude that Mount Wilson solar constant values are generally too small.

(B) *High solar constant values at Bassour correspond with high solar constant values at Mount Wilson, and vice versa.* This relation is shown in both the accompanying diagrams. Figure 1 is a plot of the successive solar constant values at the two stations for the days mentioned. Figure 2 shows the same values plotted in a manner to

better exhibit the comparison. The vertical scale (fig. 2) represents Mount Wilson values and the horizontal scale Bassour values of the solar constant for each day when satisfactory observations were secured at both stations. If the values observed were without error, it is obvious that for each day they would have been identical at the two stations. Hence, if the solar radiation had values of 1.90, 1.95, and 2 calories on three different days, they should have been represented by points at the lower left corner, the center, and the upper right corner of our diagram, if observed at both stations without

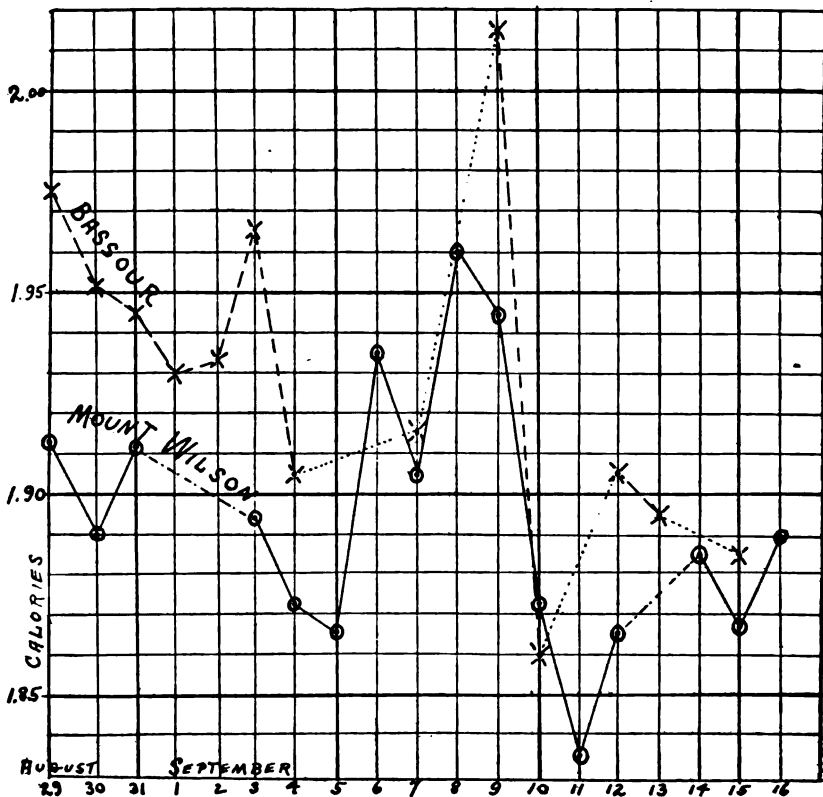


FIG. 1.—Successive solar constant values, Bassour and Mount Wilson.

error. In general all values of the solar constant would fall on the line A B of the figure if the measurements were without error. But we have found the Mount Wilson values consistently lower by 2 per cent. If we admit a constant systematic error of this magnitude, but still deny all accidental error of measurement, then all observations should fall on the line C D of our diagram. They must all lie at a single point of C D if the solar radiation is constant, but may fall anywhere upon that line if the solar radiation is variable. In practice it is of course never possible to avoid accidental errors of

measurement. Hence, we must expect that all values shall cluster about a point on CD if the sun is constant, but shall cluster about CD as an axis if the sun is variable. The latter condition is evidently the fact. Assuming the mean point of CD as a center, the average deviation from it is proportional to 8. Assuming the line CD as an axis, the average deviation from it is proportional to 3. Thus the observations are represented $8/3$ times better by assuming that the sun's radiation is variable than by assuming it constant.

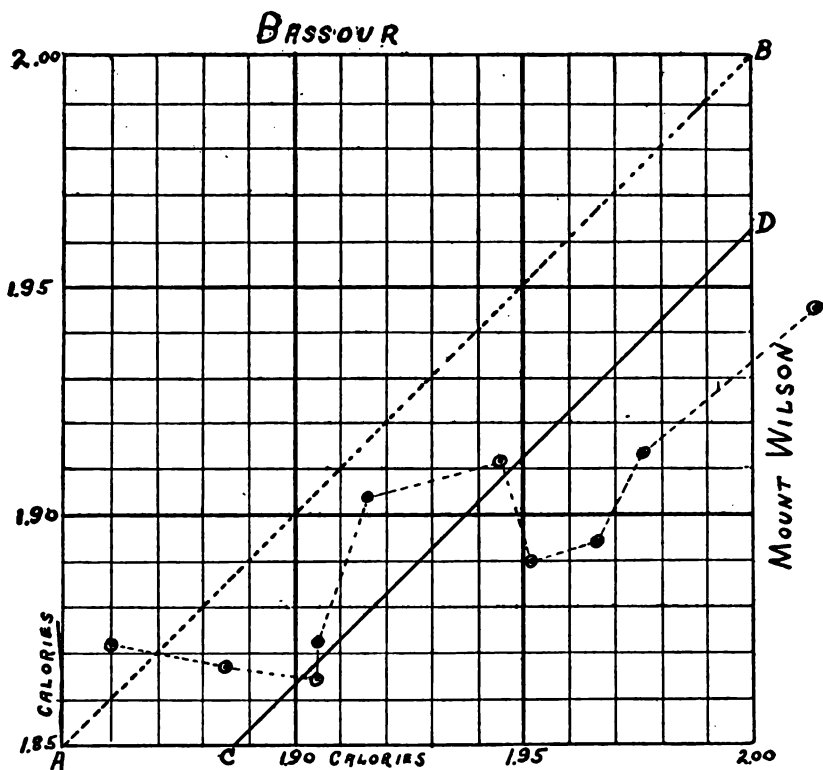


FIG. 2.—Simultaneous solar constant determinations. Bassour and Mount Wilson.

The average deviation of the values from the line CD is 0.021 calories. Hence we may conclude that simultaneous solar constant measurements at Bassour and at Mount Wilson, while differing by a constant factor of 2 per cent, exhibit accidental errors of only 1.2 per cent due to variability of the sky, errors of observing, and the like. Dividing by the square root of 2, we find that the average accidental error of a single solar constant determination at one station is 0.9 per cent. When one considers the multiplicity of the sources of error in this complex investigation, and that the result just announced depends on the uniformity of the sky during several hours, as well as

on the ordinary vicissitudes of all experimental work, the smallness of this accidental error seems remarkable.

Expeditions of 1912.—While the simultaneous observations made in 1911 at Bassour and Mount Wilson seemed justly interpretable confirming the variability of the sun, yet it was felt that a result of such uncommon interest ought to be put beyond the smallest reasonable doubt. Accordingly, in May, 1912, Mr. and Mrs. Abbot again returned to Bassour, where they were joined on May 20 by Mr. Anders Knutson Ångström, as temporary assistant. Observations were begun on June 2. Observations on Mount Wilson had already been begun by Mr. Fowle in April. June yielded 17 days of measurement at Bassour and 25 days on Mount Wilson. It is expected that the two expeditions will continue observing until about September 10, 1912. There can hardly be any question that this work, combined with that of 1911, will thoroughly prove or disprove the existence of the suspected short-period variations of the sun.

2. ON THE DISSEMINATION OF STANDARDS OF PYRHELIOMETRY.

The Smithsonian Institution having undertaken to furnish silver disk pyrheliometers at cost when useful solar researches seemed likely to be promoted thereby, the assembling of the completed instruments, their standardization, and their packing for shipment have been done at the Astrophysical Observatory. During the past year about 100 such instruments have been prepared and sent out, mostly to foreign governmental meteorological services. When returning from Argentina Mr. Abbot compared silver disk pyrheliometer A. P. O. No. 1919 at Naples and Potsdam with similar instruments furnished by the Institution. In neither case was there found any change of readings of the instruments compared. It was hoped to make comparisons also at London and Paris, but the weather prevented.

3. ON THE ABSORPTION OF RADIATION BY ATMOSPHERIC WATER VAPOR.

Mr. Fowle has continued the research on the absorption of radiation by water vapor, and has devised and published¹ a method for determining spectroscopically the total quantity of water vapor included between the observer and the sun. The method is based on spectrobolometric observations made with the long absorption tube mentioned in the last two reports, and is applicable to all bolometric observations of the sun's infra-red spectrum. It seems probably to be accurate to within 1 or 2 per cent. Heretofore there has been no method of estimating atmospheric water vapor excepting from observations of the humidity prevailing at the surface of the earth or near kites, balloons, and mountains. From such psychrometric

¹*Astrophysical Journal*, vol. 35, 1912, p. 149.

observations made at different levels general formulæ for the average humidity of the atmosphere have been derived. Mr. Fowle finds, however, that these formulæ, while representing average conditions, are often widely astray on individual days. He is preparing further data from Washington, Mount Wilson, Mount Whitney, and Bassour spectrobolometric work, to promote a more complete study of atmospheric humidity.

This investigation has yielded a valuable application for solar constant work, for Mr. Fowle has found a way to very greatly shorten the work of correcting for water vapor absorption in reducing the bolographic observations. This will diminish by about one-fifth the labor of reducing the solar constant work, and at the same time will yield results of slightly greater accuracy than before.

Atmospheric water vapor absorption work has been confined to the upper infra-red spectrum bands this year. A vacuum bolometer is in preparation, by means of which a considerable gain in sensitiveness of the apparatus is hoped for. This will greatly promote the value of the work at very great wave lengths, and accordingly this part of the work has been allowed to await the introduction of the vacuum bolometer.

PERSONNEL.

Prof. F. P. Brackett served as temporary bolometric assistant to the Algerian expedition of 1911.

Mr. Anders Knutson Ångström served as temporary bolometric assistant to the Algerian expedition of 1912.

Miss F. E. Frisby was appointed temporary computer, February 12, 1912.

Minor Clerk M. Segal resigned March 1, 1912.

F. R. Carrington was appointed messenger boy on March 25, 1912.

SUMMARY.

The year has been notable for expeditions to Algeria and California to test the supposed variability of the sun by making simultaneously at these two widely separated stations spectrobolometric determinations of the solar constant of radiation. The measurements in Algeria agree with earlier ones at Washington and Mount Whitney and indicate that Mount Wilson values are systematically a little low. Apart from this systematic error the average accidental differences between Algerian and Mount Wilson determinations were only 1.2 per cent, indicating an average accidental error of a single solar constant determination at one station of only 0.9 per cent. So far as yet reduced, *high solar constant values obtained in Algeria coincide with high values at Mount Wilson and vice versa.* A solar

variation of 4 per cent was indicated at both stations in the first half of September, 1911. Many values remain to be computed, but it can now hardly be doubted that the outcome will prove conclusively the irregular short-period variability of the sun.

Numerous copies of the silver disk pyrheliometer have been standardized and sent out, mainly to foreign governmental meteorological services.

Valuable results have been secured in the research on the transmission of radiation through atmospheric water vapor. An accurate method of estimating the total water vapor contents of the atmosphere between the observer and the sun has been devised by M. Fowle.

Respectfully submitted.

C. G. ABBOT,

Director, Astrophysical Observatory.

Dr. C. D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report on the work of the Library of the Smithsonian Institution during the fiscal year ending June 30, 1912:

As no general account of the library has appeared in the publications of the Institution for the last 16 years, it seems desirable to give a brief summary of its history in this place.

The formation of a library was included among the objects of the Institution in the act of Congress approved August 6, 1846, by which it was established. The character of this library was specified in the program of organization presented to the Board of Regents by Secretary Henry on December 8, 1847, and approved by them, in the following terms:

To carry out the plan before described, a library will be required, first, of a complete collection of the transactions and proceedings of all the learned societies in the world; second, of the more important current periodical publications and other works necessary in preparing the periodical reports.

With reference to the collection of books other than those mentioned above, catalogues of all the different libraries in the United States should be procured, in order that the valuable books first purchased may be such as are not to be found in the United States.

Also catalogues of memoirs, and of books in foreign libraries, and other materials should be collected for rendering the Institution a center of bibliographical knowledge, whence the student may be directed to any work which he may require.

In 1847 Prof. Charles C. Jewett was appointed librarian, and after some little delay began collecting books in accordance with the plan just cited. As a result of his activities the Smithsonian Library in 1852 comprised 32,000 volumes. A portion of them was obtained by purchase and others by the exchange of the publications of the Institution for those of learned societies and similar organizations in the United States and in Europe.

The expense of maintaining the library soon became a serious drain on the limited resources of the Institution, and in 1864 the Board of Regents, on the recommendation of Secretary Henry, requested Congress to authorize its deposit in the Library of Congress. An act to this effect was passed in 1866, and, in accordance with its provisions, the Smithsonian library was transferred the same year to the new fireproof rooms in the Capitol which had been prepared at

that time for the better accommodation of the Library of Congress. The Smithsonian Library then contained about 40,000 volumes. Its transfer from the Smithsonian building in nowise checked its growth. It increased in extent with every succeeding year, and in 1895 the record entries had reached 314,500, including books, pamphlets, periodicals and parts of periodicals, and maps, exclusive of certain small special collections not incorporated in the "Smithsonian deposit." The Institution at that time currently received more than 3,045 separate publications of learned societies, periodicals, and magazines, of which 1,565 related to pure science, 704 to applied science, and 776 to art, literature, trade, and a variety of other subjects. The small special collections mentioned above, known as the secretary's library, the office library, the library of the Astrophysical Observatory, the library of the National Zoological Park, the employees' library, the Exchange Service collection, and the law reference library aggregated about 10,000 publications in 1896.

In 1897 the Smithsonian library was transferred with the Library of Congress to the new building provided for the latter and placed in the east stack and in a large room adjoining the same. It was subsequently transferred to another room, which was specially equipped with metal bookcases.

It is not possible to ascertain the exact number of books, pamphlets and other publications contained in the Smithsonian library at the present time without making an actual enumeration of them, an operation which would be attended by many difficulties. It may be said, however, that at the close of the fiscal year 1912 the accession entries had reached a total for the contents of the library of 508,788 including books, pamphlets, periodicals and parts of periodicals, and maps and charts, exclusive of the small special collections already mentioned.

While the Institution has acquired by donation or otherwise many rare and valuable books and collections of books relating to other subjects than the sciences, the original program laid down by Secretary Henry has been closely followed, and the Smithsonian library deposited in the Library of Congress consists mainly of scientific periodicals and the transactions and proceedings of learned societies. With possibly one exception, it contains the most important collection of these classes of publications to be found anywhere in the world.

The increase in the activities of the National Museum which followed the great influx of collections from the United States Fish Commission and from the Centennial Exhibition of 1876 and the erection of a separate Museum building made it imperative that large numbers of books on natural history, the arts, museum administration, and other subjects should be permanently available for the scientific and administrative staff, for use in identifying and classifying

fying collections and as a source of information regarding museum methods. This resulted in the establishment of the National Museum Library, which had as its nucleus the collection presented by Secretary Baird. By small annual expenditures for the purchase of books, and by the exchange of the Museum publications, by donations, and otherwise, this library has accumulated about 42,000 volumes, 70,000 unbound papers, and a number of maps, charts, and manuscripts.

A similar need in the Bureau of American Ethnology has led to the formation of a library relating to ethnology and archeology, and especially to the North American Indians, which comprises about 21,000 volumes.

While the Library of Congress has the custody of the "Smithsonian deposit," the title of the library remains in the Institution. It continues to have free use of its books, and also enjoys the use of the books belonging to the Library of Congress. Under the provisions of the act of Congress through which the Smithsonian Library was transferred to the Library of Congress, the Institution may withdraw the books upon reimbursement to the Treasury for the expenses incurred in binding and caring for them.

As foreseen by Secretary Henry, this arrangement has both its advantages and its disadvantages. The Institution is relieved from the expense of maintaining a large library, and its books are safeguarded and housed with other similar collections, whereby the wants of students and investigators in many lines of intellectual work are provided for in one place.

On the other hand, the Institution has little within its own walls to show for its early expenditures for books, or for the great system of exchanges which has been carried on for more than half a century. Furthermore, with the growth of the National Museum and other scientific branches, under the direction of the Institution, the desirability of having a large body of books immediately at hand becomes every year more apparent. This is especially true as regards books on natural sciences, and on the industrial and fine arts, a large number of which are constantly needed by the staff of the National Museum, as well as by the other scientific bureaus of the Government and by representatives of the great body of scientific students and investigators throughout the country who are attracted to Washington by the collections of the Museum.

In order that this need might be met as far as possible without impairing the arrangement with the Library of Congress, the Museum has, as already mentioned, assembled a considerable library of its own, but it has been found desirable also to keep certain series belonging to the Smithsonian deposit at the Institution for longer periods than would be required for ordinary reference. The library of the Bureau of Ethnology is also housed in the Smithsonian Building, and, in

addition, the various small collections of books mentioned above except that of the Zoological Park, which is kept in the park offices.

To provide fireproof quarters for these and also for a portion of the National Museum Library, it was proposed last year to erect metal bookstacks in the main hall of the Smithsonian Building where they could all be brought together and economically administered. It is to be hoped that Congress will soon provide the means for carrying this plan into effect.

As regards the service of the library, the most unsatisfactory feature at present is the delay in obtaining books, which frequently occurs, owing to the fact that, in accordance with the established routine, books are received from the Library of Congress only twice a day. It is not always possible for those who use the library to cite the exact date or serial number of volumes wanted for reference, and hence, through the fault of no one, wrong books are sometimes received. This causes additional delay and dissatisfaction.

As is well known, the plan has recently been canvassed by the Government of connecting the several departments and bureaus by an underground pneumatic carrier large enough to take books of at least the usual sizes. A connection of this kind between the buildings of the Library of Congress, the Smithsonian Institution, and the National Museum would be of great utility in the service of the library and would remove the difficulties now existing as regards the delivery of books.

The greatest defect in the Smithsonian Library, and one which has existed for many years, if not from the beginning, is the lack of completeness of numerous sets of scientific serials. While this condition is not at all peculiar to this library, it is a source of much vexation to those who use the books. Secretary Langley, when in charge of the library, devised a plan by which many gaps were filled but others still remain. The Institution has never possessed funds sufficient to enable it to remedy the defects by purchase. Odd volumes of a series are not often obtainable, and to purchase the whole or the greater part of a series, in order to obtain a particular volume is an expensive procedure. Although a great deal of thought has been expended in attempts to devise a plan to overcome this difficulty, it has not led to any practical result so far as the Institution is concerned. Recently, however, the Library of Congress, through its greater resources, has succeeded in procuring many of the desired volumes, and they have been placed in the gaps in the Smithsonian series. This liberal action in the interest of scientific study seems to constitute the only possible solution of the problem at present although it would naturally be a source of greater satisfaction to the Institution if all the volumes in the various series bore the Smithsonian stamp.

ACCESSIONS.

During the fiscal year covered by this report, 29,147 packages of publications were received by mail and 2,759 packages through the International Exchange Service, making a total of 31,906 packages. Some of these packages contained as many as 20 separate parts of periodicals or other serial publications. About 4,737 acknowledgments were made on the regular forms in addition to the letters which were written in acknowledgment of publications received in response to the requests of the Institution for exchange.

The accessions for the Smithsonian deposit in the Library of Congress recorded during the year numbered 3,540 volumes, 1,951 parts of volumes, 15,826 pamphlets, and 366 charts, making a total of 21,683 publications. The accession numbers ran from 504,150 to 508,788, the parts of serial publications entered on the card catalogue numbered 19,012, and 1,225 slips were made for completed volumes, and 171 cards for new periodicals. These various publications comprised in all 52,548 separate pieces, including parts of periodicals, pamphlets, and volumes. They were sufficient to fill 364 boxes, which together contained approximately the equivalent of 14,560 volumes. In addition, 2,058 parts of serial publications secured by the Institution in exchange, to complete sets, were also sent to the Library of Congress.

The practice of sending foreign public documents presented to the Institution to the Library of Congress without stamping or entering was continued during the year, about 4,589 publications not included in any of the foregoing statistics having been sent in that manner.

The office library received as accessions 347 volumes, 42 parts of volumes, and 31 pamphlets; the Astrophysical Observatory, 114 volumes, 38 parts of volumes, and 86 pamphlets; and the National Zoological Park 10 volumes and 9 pamphlets, making a total of 677 publications.

EXCHANGES.

Efforts to establish new exchanges and to secure missing parts to complete sets of publications in the Smithsonian Library involved the writing of 3,000 letters, and resulted in the addition of about 171 new periodicals and the receipt of about 2,058 missing parts to complete volumes in the Smithsonian sets.

New exchanges for the annual reports of the American Historical Association from the allotment set aside by agreement for that purpose resulted in the acquisition of a number of publications of historical societies throughout the world. These were added to the Smithsonian deposit in the Library of Congress.

GENERAL WORK ON THE LIBRARY.

As an aid in determining the actual deficiencies in various sets in the Smithsonian deposit in the Library of Congress, a special search was made through the Library of the National Museum for volumes and parts of volumes belonging to the deposit, and it is expected that before the Museum Library is moved into the new building practically all that have lodged there will have been found and sent to the Library of Congress to be entered in the proper records. In addition, requests have been made upon institutions and societies to secure lacking parts, with the result that many sets have been completed. Revised want lists of French and English publications, prepared at the Library of Congress, were examined, and in many cases the publications were supplied by the institutions and societies.

The author catalogue for the general series of publications received was continued, and the results were all that could be desired. Catalogue cards made for the author-donor catalogue numbered 10,012. Publications catalogued comprised 11,194 volumes, 171 new periodicals, and 383 charts. Of the volumes, 1,712 were recatalogued.

During the year 3,731 parts of scientific periodicals and popular magazines and 250 bound volumes were lent to readers, making a total of 3,981.

CATALOGUE OF SMITHSONIAN PUBLICATIONS.

An analytical card catalogue of the publications of the Institution to include both author and subject entries has been begun. Some time will yet be required to complete the task, as the cards under present conditions can be prepared only during intervals in the regular work at the cataloguing and accession desks. Much thought was given to plans for the preparation of a catalogue of Smithsonian publications to be printed in book form, which is greatly needed at the present time, but on account of the limited funds available for printing it was deemed by the secretary inadvisable to undertake the work this year.

READING AND REFERENCE ROOMS.

A rearrangement of the reading rooms, to make more space for readers, is in progress. The accession books are to be placed in a case erected on the west side of the room, the table in the middle of the room is to be reduced in size, one cataloguer's desk is to be transferred to another room, and a table with bins for periodicals is to be placed under the north windows.

The publications in the reference room and those in the reading room are now in charge of one person.

ART ROOM.

The contents of this room were rearranged during the year and publications not directly relating to the fine arts placed in the sectional

libraries of the Museum. A number of books on art belonging to the Marsh collection were placed at the main entrance to the Smithsonian building in conjunction with the newly installed exhibition series illustrating the various activities of the Institution.

EMPLOYEES' LIBRARY.

The total number of loans from this collection made during the year amounted to 1,800. Two hundred and twelve volumes of periodicals were bound and made available for circulation. A number of books, especially selected for the purpose, were sent to the National Zoological Park, as in previous years. Only one book was purchased and one received as a donation.

At the time at which this collection of books was established the facilities for obtaining reading matter of general interest were quite limited, but with the opening of the Washington Public Library they were very greatly increased. In view of the large number of books in all branches of literature which are now available for readers, it does not appear necessary to expend money in extending this special collection.

LIBRARIES OF THE GOVERNMENT BRANCHES.

United States National Museum.—In previous reports reference has been made to the congested condition of the library of the National Museum. This was partly relieved in 1911 by separating out duplicates, for which work temporary assistants were employed for several months. The library still remained somewhat in confusion, however, owing to the necessity of moving various sections from time to time to make room for new accessions. These accessions arrived more rapidly than they could be disposed of, and accumulated in unassorted piles. The library also suffered greatly from dust.

Owing to the necessity of exercising rigid economy in the administration of the Museum library, the present force is scarcely able to do more than keep pace with the current routine work, which consists of registering accessions, entering current numbers of periodicals and transactions of scientific societies in the card-catalogue, classifying new accessions in accordance with the Dewey decimal system, attending to the wants of the readers and those entitled to borrow books, keeping the records of loans, and conducting the necessary correspondence. The very important task of placing books returned by borrowers, or new accessions, on the shelves is performed by the messenger, the classifier, or others, as they have opportunity. The preparation of books for binding, which requires special care, is attended to by the assistant librarian of the Museum in the intervals of other business.

As the time for removing a portion of the library to the new Museum building was approaching, and there seemed no possibility of diverting the regular force to the task of putting the book-stacks in order, the assistant secretary in charge of the Museum, at my suggestion, employed three temporary assistants who overhauled the entire contents of the stacks, thoroughly dusted the shelves and books, gave particular attention to arranging the volumes of the serials in exact order, and to restoring any books that were out of place to their proper locations. At the same time the floors were cleaned and painted to keep down dust, a few new lights were added where needed, and various minor repairs were made to windows, ventilators, etc.

As a result of these activities, the Museum library at the close of the year, though much crowded, presented a clean and orderly appearance throughout, and everything was in train for the transfer of a portion of the books to the new building without confusion or serious interruption of the regular work.

As will be learned from the report of the assistant secretary in charge of the National Museum, a readjustment of exhibits, laboratories, offices, etc., follows from the completion of the new Museum building, and it is the intention to rearrange the library to suit these new conditions. It is proposed to assemble all books on zoology, paleontology, geology, ethnology, and archeology in the new building. Books on the arts and industries, technology, and allied subjects will be assembled in the present library quarters in the old building. Books on botany and those whose contents relate to a number of different subjects will probably also remain for some time in the present quarters, though, as already mentioned, it is hoped that Congress will soon make provision for these and certain Smithsonian books, together with the library of the Bureau of Ethnology, in the main hall of the Smithsonian building.

At the request of the assistant secretary of the Museum, the assistant librarian of the Institution and myself prepared definite plans for the installation of the portion of the library already mentioned in the new Museum building, in well-adapted rooms on the ground floor at the northeast corner. Contracts were made for the metal stacks and other fittings, in accordance with these plans, and at the close of the year they were nearly ready for delivery. It is expected that when this equipment is finished the Museum will have a compact, economical, commodious, well-lighted, and well-arranged library, installed in accordance with the latest and most improved methods.

Many important donations of books were received by this library during the year, and the following officers and associates also presented publications: Dr. Charles D. Walcott, Dr. Theo. N. Gill,

Dr. Edgar A. Mearns, Dr. William H. Dall, Mr. R. Ridgway, Dr. C. W. Richmond, Mr. J. C. Crawford, Dr. O. P. Hay, Dr. A. C. Peale, Mr. W. R. Maxon, and Mr. F. D. Millet.

The Museum library, according to the best statistics available, now contains about 42,000 volumes, 70,000 unbound papers, and 122 manuscripts, besides maps, charts, etc. The accessions during the year consisted of 1,791 books, 3,608 pamphlets, and 276 parts of volumes. During the same period 824 books, 960 complete volumes of periodicals, and 3,622 pamphlets were catalogued.

Attention was given as in previous years to the preparation of volumes for binding. In all 543 books were sent to the Government bindery during the year. The binding is, however, still much in arrears, and it is hoped that more money can be devoted to this purpose in the future. Large numbers of pamphlets need cardboard covers to protect them from injury. Though the covers themselves are available, it is impossible with the present force to bring them into use to the extent required.

During the year 24,815 books, periodicals, and pamphlets were borrowed from the library, among them 5,515 obtained from the Library of Congress and other libraries, and 4,560 were assigned to the sectional libraries of the Museum. The majority of these sectional libraries contain publications that are constantly needed by the several curators and other officers in identifying and classifying material, working up collections for publication, writing exhibition labels, etc., and the books are kept together as long as required, though any of them may be recalled temporarily to the general library for the use of readers. Similar collections of books on museum administration, museum methods, etc., are kept in the offices of the assistant secretary in charge of the Museum, the administrative assistant, the editor, and the superintendent. In all, 31 such sectional libraries are now in existence, one relating to textiles having been added during the year.

The records of the Museum library consist of accession book and an author catalogue, a periodical record, and a lending record in card form. The lending record includes books borrowed from the Library of Congress and from other libraries for the use of the Museum staff.

Correspondence relative to new exchanges and missing parts of serial publications already in the Museum library was carried on as in previous years. A number of new titles were added by this means.

Bureau of American Ethnology.—The report on this library will be made by the ethnologist in charge and incorporated in his general report on the operations of the bureau.

Astrophysical Observatory.—Owing to lack of room in the office of the observatory, a part of the books belonging to this library have

been kept in the Smithsonian building. During the year this latter portion was transferred from one of the tower rooms where it was difficult of access to the southwest gallery in the main hall of the building. Additions, comprising 114 volumes, 38 parts of volumes, and 86 pamphlets, were received during the year.

National Zoological Park.—To this small reference library of zoological publications relating to the work of the park 10 volumes and 9 pamphlets were added during the year.

Summary of accessions.—The following statement summarizes all the accessions for the year, except the Bureau of American Ethnology, which is administered separately:

Smithsonian deposit in the Library of Congress.....	21,683
Smithsonian office, Astrophysical Observatory, National Zoological Park, and International Exchange Service.....	677
United States National Museum.....	5,675
Total.....	28,035

Very respectfully,

F. W. TRUE,
*Assistant Secretary, in charge
of Library and Exchanges.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

OCTOBER 9, 1912.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1912:

The International Catalogue of Scientific Literature is an organization consisting of 32 regional bureaus representing the principal countries of the world. Control over the entire enterprise is vested in an international convention which meets at regular stated intervals. The regional bureaus supply to a central bureau in London classified index citations to the scientific literature published within their several regions.

The duties of the central bureau consist in editing and publishing the citations thus forwarded. The published catalogue comprises 17 annual volumes, one for each of the following-named subjects: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology. Each country cooperating supports its own regional bureau, this support in most cases being in the form of direct governmental grants. The maintenance of the central bureau, which bears the cost of editing and publishing the catalogue, is dependent on the funds received from the sale of the published volumes.

The Royal Society of London has stood financial sponsor for the enterprise since the beginning of the undertaking in 1901, and it has been through the generous financial assistance of this body that the publication of the work has been possible.

The organization has now been at work over 10 years, and the published results have met the exacting requirements of a classified index to the vast scientific activities of the day; but the price of the work to subscribers, although below the cost of publication, is so large that its usefulness is greatly limited. For this reason a permanent endowment is urgently needed in order that the central bureau may have a fixed income independent of the sum derived from the sale of the published volumes. It is believed that if such an endowment could be obtained the cost of the catalogue could be reduced possibly to one-half its present subscription price, which is \$85 per year. This reduction in price would undoubtedly largely increase

the sales, and as a larger edition of the work would cost comparatively little more than the present limited edition any increase in the demand would approximately be clear profit to the central bureau.

This result is not only desirable from a financial standpoint but also because it is believed that this international index to scientific literature, whose scope is now limited to pure science, is but a beginning to what will eventually be an international index to not only the pure but also to the applied sciences. This will mean that the organization will ultimately furnish classified citations to the original literature of many of the professions, arts, and trades whose practices and methods are now much interwoven with, and dependent on the advance of pure science.

The appropriation made by Congress for the maintenance of the regional bureau for the United States during the year was \$7,500, this being the same sum that was appropriated for the previous year. Five persons are regularly employed in this bureau in collecting, indexing, and classifying the scientific literature published in the United States.

The practice of having the more technical scientific papers referred for analysis and classification to specialists in the subjects treated has been found very satisfactory and is now carried on to the exclusion of the former practice of corresponding with the authors of the papers, for it was found that to correspond and advise with authors necessitated much clerical labor and often caused long delays in obtaining the information sought.

During the year 27,201 cards were sent from this bureau to the London central bureau as follows:

Literature of—	
1903-----	4
1904-----	243
1905-----	386
1906-----	562
1907-----	1,480
1908-----	1,949
1909-----	3,372
1910-----	5,231
1911-----	13,974
Total-----	27,201

Since the bureau was established in 1901, 262,335 cards have been forwarded to the central bureau.

The following table shows the number of cards sent each year as well as the number of cards representing the literature of each year from 1901 to 1911, inclusive.

Literature of..	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	Total for year
Year ending June 30—												
1902.....	6,990											6,990
1903.....	6,150	8,330										14,480
1904.....	3,044	9,424	8,745									21,213
1905.....	1,619	2,780	11,143	8,640								24,182
1906.....	301	622	3,538	12,139	9,001							25,601
1907.....	384	511	862	5,272	9,022	12,578						28,629
1908.....	408	523	366	956	5,629	7,217	13,429					28,528
1909.....	133	235	373	309	1,656	4,410	8,509	18,784				34,409
1910.....	72	173	248	465	1,163	1,502	3,160	6,305	11,994			26,082
1911.....	3	26	28	218	129	374	423	1,301	8,836	14,682		26,020
1912.....			4	243	386	562	1,480	1,949	3,372	5,231	13,974	27,201
Total...	19,104	22,624	25,307	28,242	26,986	26,643	27,001	28,339	24,202	19,913	13,974	262,335

During this time the London central bureau had received from all of the 32 bureaux cooperating in the production of the International Catalogue a total of 2,059,036 cards, and as 262,335 of these represented the cards received from the United States, it will be seen that about 13 per cent of the work has been done by the regional bureau for the United States. All of the first eight annual issues of the catalogue, consisting of 17 volumes each, have been published, together with 15 volumes of the ninth annual issue and 4 volumes of the tenth annual issue, making a total of 155 volumes of the regular catalogue.

Following an established policy to consolidate the catalogue whenever possible with similar enterprises, an agreement has been made with the International Seismological Association whereby the yearly International Catalogue volume on geology will be enlarged and the section "Internal dynamics," containing an index to seismology, be published not only as a regular part of the International Catalogue, but also separately for the use of the International Seismological Association.

It is a matter of regret that this bureau is not yet able to afford the expense of issuing cards, in advance of the regular published volumes, for the immediate use of persons desiring prompt notice of papers appearing on any of the subjects embraced within the scope of the work. Plans having this object in view have been under consideration for some time, but as yet the necessary funds are not available for the purpose. It is not intended to issue cards in place of annual volumes, but to distribute classified index cards as soon as a paper is published, for the immediate information of those interested in the advance of science.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1912:

The Institution has published one memoir of the "Smithsonian Contributions to Knowledge," 35 papers of the "Smithsonian Miscellaneous Collections," and one annual report. There were also issued by the Bureau of Ethnology 1 annual report and 2 bulletins, and by the United States National Museum 53 miscellaneous papers of the Proceedings, 3 bulletins, and 5 parts of volumes pertaining to the National Herbarium.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

1948. Langley memoir on mechanical flight. Part I, 1887 to 1896, by Samuel Pierpont Langley, edited by Charles M. Manly. Part II, 1897 to 1903, by Charles M. Manly. Published August 18, 1911. Pages i to x, 320, with 101 plates. Vol. 27, No. 3.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

In the series of Smithsonian Miscellaneous Collections there were published (1) 17 papers, cover and preliminary pages for volume 56; (2) 4 papers of volume 57; and (3) 14 papers of volume 59, as follows:

2014. Cambrian geology and paleontology. II. No. 5: Middle Cambrian Annelids. By Charles D. Walcott. Published September 4, 1911. Pages 109 to 144. Plates 18 to 23. Vol. 57, No. 5.

2015. Description of a new genus and species of hummingbird from Panama. By E. W. Nelson. Published July 8, 1911. Pages 2. Vol. 56, No. 21.

2051. Cambrian geology and paleontology. II. No. 6: Middle Cambrian Branchiopoda, Malacostraca, Trilobita, and Merostomata. By Charles D. Walcott. Published March 13, 1912. Pages 145 to 228, with unpagged index. Plates 24 to 34. Vol. 57, No. 6.

2053. Two new subspecies of birds from Panama. By E. W. Nelson. Published September 7, 1911. One page. Vol. 56, No. 22.

2054. On *Psomlocarpa*, a neglected genus of ferns. By Dr. H. Christ, Basel. Published November 21, 1911. Pages 4. Plate 1. Vol. 56, No. 23.

2055. A remarkable new fern from Panama. By William R. Maxon. Published November 22, 1911. Pages 5. Plates 3. Vol. 56, No. 24.

2056. Descriptions of seven new African grass-warblers of the genus *Cisticola*. By Edgar A. Mearns. Published November 23, 1911. Pages 6. Vol. 56, No. 25.
2058. A new kingfisher from Panama. By E. A. Goldman. Published December 1, 1911. Pages 2. Vol. 56, No. 27.
2059. Description of a new species of sunbird, *Hellonympha raineyi*, from British East Africa. By Edgar A. Mearns. Published November 28, 1911. One page. Vol. 56, No. 28.
2062. Four new mammals from the Canadian Rockies. By N. Hollister. Published December 5, 1911. Pages 4. Vol. 56, No. 26.
2064. Three new club mosses from Panama. By William R. Maxon. Published January 6, 1912. Pages 4. Plates 4. Vol. 56, No. 29.
2066. A new subspecies of Ptarmigan from the Aleutian Islands. By A. C. Bent. Published January 6, 1912. Pages 2. Vol. 56, No. 30.
2067. Report on an investigation of the geological structure of the Alps. By Bailey Willis. Published February 7, 1912. Pages 13. Vol. 56, No. 31.
2068. Notes on birds observed during a brief visit to the Aleutian Islands and Bering Sea in 1911. By A. C. Bent. Published February 12, 1912. Pages 29. Vol. 56, No. 32.
2069. Three new plants from Alberta. By Paul C. Standley. Published February 7, 1912. Pages 3. Vol. 56, No. 33.
2070. A new leather flower from Illinois. By Paul C. Standley. Published February 7, 1912. Pages 3. Plate 1. Vol. 56, No. 34.
2071. The natives of Kharga Oasis, Egypt. By Aleš Hrdlička. Published April 15, 1912. Pages 118. Plates 38. Vol. 59, No. 1.
2072. New mammals from Canada, Alaska, and Kamchatka. By N. Hollister. Published February 7, 1912. Pages 8. Plates 3. Vol. 56, No. 35.
2073. Descriptions of twelve new species and subspecies of mammals from Panama. By E. A. Goldman. Published February 19, 1912. Pages 11. Vol. 56, No. 36.
2074. Descriptions of two new species of nun birds from Panama. By E. W. Nelson. Published February 16, 1912. Pages 2. Vol. 56, No. 37.
2075. Cambrian geology and paleontology. II. No. 7: Cambro-Ordovician boundary in British Columbia, with description of fossils. By Charles D. Walcott. Published March 8, 1912. Pages 229 to 237. Plate 35. Vol. 57, No. 7.
2076. Cambrian geology and paleontology. II. No. 8: The Sardinian Cambrian genus *Olenopsis* in America. Published March 8, 1912. Pages 239 to 249. Plate 36. Vol. 57, No. 8.
2077. New species of fossil shells from Panama and Costa Rica. Collected by D. F. MacDonald. By William Healey Dall. Published March 2, 1912. Pages 10. Vol. 59, No. 2.
2078. Description of a new subspecies of monkey from British East Africa. By N. Hollister. Published March 2, 1912. Pages 2. Vol. 59, No. 3.
2079. Descriptions of new genera and species of microlepidoptera from Panama. By August Busck. Published March 9, 1912. Pages 10. Plate 1. Vol. 59, No. 4.
2080. New genus and species of hymenoptera of the family Braconidae from Panama. By H. L. Viereck. Published March 9, 1912. Pages 2. Vol. 59, No. 5.
2081. The genera of fossil whalebone whales allied to *Balenoptera*. By Frederick W. True. Published April 3, 1912. Pages 8. Vol. 59, No. 6.

2082. Observations on the habits of the crustacean *Emerita analoga*. By Frank Walter Weymouth and Charles Howard Richardson, jr. Published May 1, 1912. Pages 13. Plate 1. Vol. 59, No. 7.
2083. Hamilton lecture. Infection and recovery from infection. By Simon Flexner, M. D. Published May 29, 1912. Pages 14. Plates 5. Vol. 59, No. 8.
2085. National Zoological Park. Notes on animals now, or recently, living in the National Zoological Park. By A. B. Baker. Published May 17, 1912. Pages 3. Plate 1. Vol. 59, No. 9.
2086. National Zoological Park. Further notes on the breeding of the American black bear in captivity. By A. B. Baker. Published May 17, 1912. Pages 3. Plate 1. Vol. 59, No. 10.
2088. Sawflies from Panama, with descriptions of new genera and species. By S. A. Rohwer. Published May 18, 1912. Pages 6. Vol. 59, No. 12.
2090. New decapod crustaceans from Panama. By Mary J. Rathbun. Published May 20, 1912. Pages 3. Vol. 59, No. 13.
2091. Smithsonian Miscellaneous Collections. Cover and preliminary pages for volume 56. Pages i to vii.
2092. Report on landshells collected in Peru in 1911 by the Yale expedition under Prof. Hiram Bingham, with descriptions of a new subgenus, a new species, and new varieties. By William Healey Dall. Published June 1, 1912. Pages 12. Vol. 59, No. 14.
2093. Names of the large wolves of northern and western North America. By Gerrit S. Miller, jr. Published June 8, 1912. Pages 5. Vol. 59, No. 15.

The following papers of the Smithsonian Miscellaneous Collections were in press at the close of the year:

1987. Bibliography of the geology and mineralogy of tin. By Frank L. and Eva Hess. Pages i to v, 408. Vol. 58, No. 2.
2087. Expeditions organized or participated in by the Smithsonian Institution in 1910 and 1911. Pages 51. Plate 1. Figs. 56. Vol. 59, No. 11.
2094. New rodents from British East Africa. By Eldmund Heller. Pages 2. Vol. 59, No. 16.
2133. New diptera from Panama. By J. R. Malloch. Pages 8. Vol. 59, No. 17.
2134. New species of landshells from the Panama Canal Zone. By William H. Dall. Pages 3. Plates 2. Vol. 59, No. 18.

SMITHSONIAN ANNUAL REPORTS.

The Annual Report of the Board of Regents for 1910 was published in January, 1912.

2050. Annual Report of the Board of Regents of the Smithsonian Institution showing operations, expenditures, and conditions of the Institution for the year ending June 30, 1910. Octavo. Pages i to vii, 688. Plates 129 and map. Containing publications 2001, 2002, and 2016-2049.

Small editions of the following papers, forming the general appendix of the Annual Report of the Board of Regents for 1910, were issued in pamphlet form:

2016. Melville Weston Fuller, 1833-1910, by Charles D. Walcott. Pages 113-120 with 1 plate.
2017. Ornamentation of rugs and carpets, by Alan S. Cole. Pages 125-144, with 6 plates.

2018. Recent progress in aviation, by Octave Chanute. Pages 145-167, with 19 plates.
2019. Progress in reclamation of arid lands in the western United States, by F. H. Newell. Pages 169-198, with 12 plates.
2020. Electric power from the Mississippi River, by Chester M. Clark. Pages 199-210, with 8 plates.
2021. Safety provisions in the United States Steel Corporation, by David S. Beyer. Pages 211-229, with 11 plates.
2022. The insulation of an ion, a precision measurement of its charge, and the correction of Stokes's Law, by R. A. Millikan. Pages 231-356.
2023. The telegraphy of photographs, wireless and by wire, by T. Thorne Baker. Pages 357-274, with 2 plates.
2024. Modern ideas on the constitution of matter, by Jean Becquerel. Pages 275-290.
2025. Some modern developments in methods of testing explosives, by Charles E. Munroe. Pages 291-306, with 12 plates.
2026. Sir William Huggins, by W. W. Campbell. Pages 307-317, with 1 plate.
2027. The solar constant of radiation, by C. G. Abbot. Pages 319-328.
2028. Astronomical problems of the Southern Hemisphere, by Heber D. Curtis. Pages 329-340.
2029. The progressive disclosure of the entire atmosphere of the sun, by Dr. H. Deslandres. Pages 341-356, with 4 plates.
2030. Recent progress in astrophysics in the United States, by J. Boaler. Pages 357-370, with 8 plates.
2031. The future habitability of the earth, by Thomas Chrowder Chamberlin. Pages 371-389.
2032. What is terra firma? A review of current research in isostasy, by Bailey Willis. Pages 391-406, with 3 plates.
2033. Transpiration and the ascent of sap, by Henry H. Dixon. Pages 407-425.
2034. The sacred ear-flower of the Aztecs, by William Edwin Safford. Pages 427-431, with 1 plate.
2035. Forest preservation, by Henry S. Graves. Pages 433-445, with 7 plates.
2036. Alexander Agassiz, 1835-1910, by Alfred Goldsborough Mayer. Pages 447-472, with 1 plate.
2037. Recent work on the determination of sex, by Leonard Doncaster. Pages 473-485.
2038. The significance of the pulse rate in vertebrate animals, by Florence Buchanan. Pages 487-505.
2039. The natural history of the solitary wasps of the genus *Synagris*, by E. Roubaud. Pages 507-525, with 4 plates.
2040. A contribution to the ecology of the adult Hoatzin, by C. William Beebe. Pages 527-543, with 7 plates.
2041. Migration of the Pacific plover to and from the Hawaiian Islands, by Henry W. Henshaw. Pages 545-559.
2042. The plumages of the ostrich, by Prof. J. E. Duerden. Pages 561-571, with 8 plates.
2043. Manifested life of tissues outside of the organism, by Alexis Carrel and Montrose T. Burrows. Pages 573-582.
2044. The origin of Druidism, by Julius Pokorny. Pages 583-597.
2045. Geographical and statistical view of the contemporary Slav peoples, by Labor Niederle. Pages 599-612, with colored map.
2046. The cave dwellings of the Old and New Worlds, by J. Walter Fewkes. Pages 613-634, with 11 plates.

2047. The origin of West African crossbows, by Henry Balfour. Pages 635-650, with 1 plate.

2048. Sanitation on farms, by Allen W. Freeman. Pages 651-657.

2049. Epidemiology of tuberculosis, by Robert Koch. Pages 659-674.

The report of the executive committee and Proceedings of the Board of Regents of the Institution, as well as the report of the secretary, for the fiscal year ending June 30, 1911, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in December, 1911, as follows:

2061. Report of the executive committee and Proceedings of the Board of Regents for the year ending June 30, 1911. Pages 19.

2065. Report of the secretary of the Smithsonian Institution for the year ending June 30, 1911. Pages 91.

The general appendix to the Smithsonian Report for 1911 was in type, but actual presswork could not be completed before the close of the fiscal year. In the general appendix are the following papers:

The gyrostatic compass, by H. Marchand.

Radiotelegraphy, by G. Marconi.

Multiplex telephony and telegraphy by means of electric waves guided by wires, by George O. Squier.

Recent experiments with invisible light, by R. W. Wood.

What electrochemistry is accomplishing, by Joseph W. Richards.

Ancient and modern views regarding the chemical elements, by William Ramsay.

The fundamental properties of the elements, by Theodore William Richards.

The production and identification of artificial precious stones, by Noel Heaton.

The sterilization of drinking water by ultra-violet radiations, by Jules Courmont.

The legal time in various countries, by M. Philippot.

Some recent interesting developments in astronomy, by J. S. Plaskett.

The age of the earth, by J. Joly.

International air map and aeronautical marks, by Ch. Lallemand.

Geologic work of ants in tropical America, by J. C. Branner.

On the value of the fossil floras of the arctic regions as evidence of geological climates, by A. G. Nathorst.

Recent advances in our knowledge of the production of light by living organisms, by F. Alex. McDermott.

Organic evolution; Darwinian and de Vriesian, by N. C. Macnamara.

Magnalia naturæ: or the greater problems of biology, by D'Arcy Wentworth Thompson.

A history of certain great horned owls, by Charles R. Keyes.

The passenger pigeon, by Pehr Kalm (1759), and John James Audubon (1831).

Note on the iridescent colors of birds and insects, by A. Mallock.

On the positions assumed by birds in flight, by Bentley Beetham.

The garden of serpents, Butantan, Brazil, by S. Pozzi.

Some useful native plants from New Mexico, by Paul C. Standley.

The tree ferns of North America, by William R. Maxon.

The value of ancient Mexican manuscripts in the study of the general development of writing, by Alfred M. Tozzer.

- The discoverers of the art of iron manufacture, by W. Belck.
 The Kabyles of north Africa, by A. Lissauer.
 Chinese architecture and its relation to Chinese culture, by Ernst Boerschmann.
 The Lolos of Kientchang, western China, by A. F. Legendre.
 The physiology of sleep, by R. Legendre.
 Profitable and fruitless lines of endeavor in public health work, by Edwin O. Jordan.
 Factory sanitation and efficiency, by C.-E. A. Winslow.
 The physiological influence of ozone, by Leonard Hill and Martin Flack.
 Traveling at high speeds on the surface of the earth and above it, by H. S. Hele-Shaw.
 Robert Koch, 1843-1910, by C. J. M.
 Sir Joseph Dalton Hooker, 1817-1911, by Lieut. Col. D. Prain.

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form, during the year:

2013. Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 30-37. Published July, 1911. Pages 69-88.
 2060. Opinions rendered by the International Commission on Zoological Nomenclature. Opinions 38-51. Published February, 1912. Pages 89-117.
 2052. Classified list of Smithsonian Publications available for distribution, January, 1912. Published January, 1912. Pages vi, 29.
 2064. Publications of the Smithsonian Institution issued between January 1, and April 1, 1912. One page.
 A single folder, containing map showing Smithsonian and National Museum buildings, and information pertaining thereto.

There were no special publications in press at the close of the year.

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the proceedings of the United States National Museum, and (c) the Bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

The publications issued by the National Museum during the year comprised the annual report for 1911; papers 1848, 1853, 1856 to 1879 of volume 41, Proceedings; papers 1880 to 1906 of volume 42, Proceedings; three bulletins and five parts of Contributions from the National Herbarium.

The bulletins were as follows:

- No. 50, Part 5. Birds of North and Middle America, by Robert Ridgway.
 No. 77. The early Paleozoic Bryozoa of the Baltic Provinces, by Ray S. Bassler.
 No. 78. Catalogue of a selection of art objects from the Freer Collection exhibited in the new building of the National Museum.

In the series of Contributions from the National Herbarium (octavo) there appeared:

- Vol. 13, Part 11. The Alliaceae of Mexico and Central America, by Paul Standley.
- Vol. 13, Part 12. New or noteworthy plants from Columbia and Central America, by Henry Pittier.
- Vol. 14, Part 3. The Gramina grasses: *Bouteloua* and related genera, by David Griffiths.
- Vol. 16, Part 1. Miscellaneous papers, by William R. Maxon, J. N. Rose, Paul Standley, and R. S. Williams.
- Vol. 16, Part 2. Studies of Tropical American Ferns, by William R. Maxon.

There were also published in completed form volumes 39, 40, and 41 of Proceedings, and a new edition of Bulletin 39, Part N.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY

The publications of the bureau are discussed elsewhere in the Secretary's report. The editorial work is in the charge of Mr. J. G. Gurley.

One annual report and two bulletins were issued during the year as follows:

- Twenty-seventh Annual Report, comprising the administrative report for the year ending June 30, 1906, and a paper entitled "The Omaha Tribe," by Alice C. Fletcher and Francis La Flesche. Published 1911. Royal octavo. Pages 1 to 672, with 65 plates and 132 figures.
- Bulletin 47. A dictionary of the Biloxi and Ofo Languages, with thirty-one Biloxi texts and numerous Biloxi phrases, by James Owen Dorsey and John R. Swanton. Published 1912. Octavo. Pages i to v, 340.
- Bulletin 49. List of publications of the Bureau of American Ethnology. Published 1911. Octavo. Pages 1 to 34.

PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

There were no new publications issued by the Astrophysical Observatory during the year.

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution, and are communicated to Congress under the provisions of the act of incorporation of the association.

Volume 2 of the annual report for 1908, sent to the printer April 26, 1910, was published during the past fiscal year. On account of the size of the work it was issued in two parts, pages 1 to 807, and 808 to 1617, and comprised Parts II and III of Texas Diplomatic Correspondence, edited by the late Prof. George P. Garrison.

There was also published the annual report for 1909, with the following contents:

1. Report of the proceedings of the twenty-fifth annual meeting of the American Historical Association, by Waldo G. Leland, secretary.
2. Twenty-fifth anniversary celebration: Proceedings of the Carnegie Hall meeting.
3. Report of the proceedings of the sixth annual meeting of the Pacific coast branch, by Jacob N. Bowman, secretary of the branch.
4. Western Asia in the reign of Sennacherib of Assyria (705-689), by Albert T. Olmstead.
5. The teaching of mediæval archæology, by Camille Enlart.
6. Paradoxes of Gladstone's popularity, by Edward Porritt.
7. Bismarck as historiographer, by Guy Stanton Ford.
8. Some aspects of postal extension into the West, by Julian P. Bretz.
9. Side lights on the Missouri compromise, by Frank Heywood Hodder.
10. Two studies in the history of the Pacific Northwest, by Edmond S. Meany:
 1. The towns of the Pacific Northwest were not founded on the fur trade.
 2. Morton Matthew McCarver, frontier city builder.
11. The place of the German element in American history, by Julius Goebel.
12. The Dutch element in American history, by H. T. Colenbrander.
13. The Dutch element in the United States, by Ruth Putnam.
14. Report of the conference on the contribution of the Romance nations to the history of America, by William R. Shepherd.
15. Historical societies in Great Britain, by George W. Prothero.
16. The work of Dutch historical societies, by H. T. Colenbrander.
17. The historical societies of France, by Camille Enlart.
18. The work of historical societies in Spain, by Rafael Altamira.
19. Proceedings of the sixth annual conference of historical societies, by Waldo G. Leland.
20. Tenth annual report of the public archives commission.
 - Appendix A. Proceedings of the first annual conference of archivists.
 - Appendix B. Report on the archives of the State of Illinois, by C. W. Alvord and T. C. Pease.
 - Appendix C. Report on the archives of New Mexico, by J. H. Vaughan.
21. Writings on American history, 1909, by Grace G. Griffin.

The manuscript of volume 1 of the annual report for 1910 was sent to the printer June 2, 1911.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Fourteenth Annual Report of the National Society of the Daughters of the American Revolution, for the year ending October 11, 1911, was communicated to Congress February 26, 1912.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee

have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian Miscellaneous Collections. The committee also considered forms of routine blanks and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-one meetings were held and 156 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1913



(Publication 2249)

WASHINGTON
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1913

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REPORT

OF THE

SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1913.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith a report on the operations of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1913, including work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature. There is also included an outline of work proposed in the Langley Aerodynamical Laboratory, the establishment of which has been authorized by the Board of Regents under a grant from the Hodgkins fund of the Institution.

The general report reviews the affairs of the Institution proper and briefly summarizes the operations of its several branches, while the appendices contain detailed reports by the assistant secretaries and others directly in charge of various activities. The reports on operations of the National Museum and the Bureau of American Ethnology will also be published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city

of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board it becomes my sad duty to record the death on October 30, 1912, of its Chancellor, James Schoolcraft Sherman, Vice President of the United States. Resolutions in memory of Chancellor Sherman were adopted by the Regents at their annual meeting on December 12, when the Hon. Edward D. White, Chief Justice of the United States, was elected Chancellor of the Institution.

Dr. Andrew D. White was reappointed as Regent to serve until June 26, 1918; the Hon. Charles W. Fairbanks to serve until July 3, 1918; and Judge Gray to serve until February 7, 1919. Senator Bacon was reappointed a Regent, and Senator William J. Stone was appointed to succeed the Hon. Shelby M. Cullom, whose term as United States Senator expired in March, 1913. The Hon. Thomas R. Marshall, Vice President of the United States, became a Regent on March 4, 1913.

The roll of Regents at the close of the fiscal year was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Augustus O. Bacon, Member of the Senate; William J. Stone, Member of the Senate; John Daltzell, Member of the House of Representatives; Scott Ferris, Member of the House of Representatives; Irvin S. Pepper, Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

Regular meetings of the Board of Regents were held on December 12, 1912, and February 13, 1913, and a special meeting on May 1, 1913. The minutes of these meetings have been printed as usual for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the secretary. The annual financial report of the Executive Committee has also been issued in the usual form, and a detailed statement of disbursements from Government appropriations under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches will be submitted by the secretary to Congress in compliance with the law.

GENERAL CONSIDERATIONS.

The activities of the Smithsonian Institution under its plan of organization cover practically the entire field of the natural and physical sciences, as well as anthropological and archeological re-

searches. The Institution was founded for the increase and diffusion of knowledge. It is an Institution of record, research, and education, and also of cooperation. It offers facilities for the advancement of human knowledge through original research and investigation in every field and educates the people through the publication of the results of such researches. There is reciprocal cooperation between the Smithsonian Institution and the several departments of the United States Government and learned societies in this country and abroad in carrying forward important explorations and lines of investigation.

Some of the scientific studies originating with the Smithsonian Institution in this country have since developed into distinct and important bureaus and departments of the Government. The influence of the Institution is world-wide; through its international exchange service alone it is in correspondence with more than 60,000 individuals and learned societies in the United States and practically in every land on the globe. During its entire existence there has been an unbroken record of friendly intercourse with every agency devoted to the encouragement of learning. As was said in 1896, by the late Dr. Daniel Coit Gilman, "Without any patronage, without the power to bestow much pecuniary assistance, * * * the Smithsonian has been, and is, the great auxiliary of science and education throughout the length and breadth of the land."

The extent of the activities of the Institution is limited only by the amount of the funds available. During recent years its private income has been supplemented on several occasions by friends of the Institution who have generously provided the means for carrying on certain explorations and lines of research, but opportunities for further important work constantly arise which must be declined or temporarily held in abeyance. Some of the projects proposed are such as could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

Research Corporation.—The work of the Research Corporation, organized primarily for handling the Cottrell patents offered to the Institution for the benefit of research, has been progressing steadily during the year. As explained in detail in my last report, this corporation was organized February 8, 1912, under the laws of the State of New York as a means of furthering scientific and technical research. It objects as stated in its prospectus are:

First, to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income, and, second, to apply all profits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors. For these purposes the corporation has been capitalized at \$20,000, divided into 200 shares, but the charter

provides that no dividends shall be paid and that the entire net profits shall be devoted to research, all the stock being held under a stockholders' agreement, which recites that the corporation has been organized for the purpose of aiding and encouraging technical and scientific research, and not for personal or individual profit.

At the present time many discoveries are constantly being made, which undoubtedly possess a greater or less potential value, but which are literally being allowed to go to waste for lack of thorough development. This is due, in some cases, to the fact that the inventors are men in the service of the Government or in the universities or technical schools, who are retarded either by official positions, lack of means, or reluctance to engage in commercial enterprises, and in other cases to the fact that a discovery made incidentally in the laboratory of a manufacturing corporation does not lend itself to the particular purpose of such corporation. True conservation demands that such by-products as these shall be developed and utilized to the fullest extent of which they are capable. The Research Corporation aims to supply this demand and, through the cooperation of the Smithsonian Institution and the universities, to carry forward the work of investigation already begun by others upon lines which promise important results and to perfect such inventions as may prove to possess commercial value, thus bringing scientific institutions into closer relations with industrial activities and furthering the improvements of industrial processes.

The establishment of the Research Corporation was rendered immediately possible by the acquisition, through the gift of Dr. F. G. Cottrell, of the United States Bureau of Mines, and his associates, of a valuable set of patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. These devices are in operation in several States, and are fully described in an article in *Industrial and Engineering Chemistry*, for August, 1911.

A number of other patents in various fields of industry have been offered by officers of the Government and scientific institutions, as well as by manufacturing corporations holding patents not available for their own purposes, and undoubtedly there are many others, both in this country and abroad, who will be glad to have their inventions utilized for the benefit of scientific research. The Smithsonian Institution is interested in the management of this corporation through the membership of the secretary in its board of directors, which is composed of business and professional men, many of whom have had experience in large industrial and mining enterprises.

The George W. Poore bequest.—By the terms of the will of the late George W. Poore, of Lowell, Mass., who died December 17, 1910, the Smithsonian Institution becomes his residuary legatee. As mentioned in my 1910 report, the estate, estimated at about \$40,000, is bequeathed under the condition that the income of this sum should be added to the principal until a total of \$250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created. The estate is still in process of settlement by the executors.

As a reason for making this bequest to the Smithsonian Institution, Mr. Poore in his will says: "I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institution to be, and yet it has been neglected and overlooked by American citizens."

The Kahn Foundation.—The Smithsonian Institution is closely allied with a number of organizations and movements of importance to the public through the membership of the secretary in various boards of trustees. Some of these are mentioned elsewhere in this report and among others are the Carnegie Institution of Washington, with whose administration the secretary has been connected since its establishment, and "The Kahn Foundation for the Foreign Travel of American Teachers." The last-named organization was founded in 1911 through a deed of gift and trust between Albert Kahn, of Paris, France, of the first part, and Edward D. Adams, Nicholas Murray Butler, Henry Fairfield Osborn, of New York; Charles W. Eliot, of Cambridge; and Charles D. Walcott, of Washington, of the second part. The founder had heretofore established certain trust funds in France, Germany, Japan, England, and other countries for the purpose of defraying the expenses of teachers and supplying them with what he termed "bourses de voyage" so as to enable them to travel, observe, and study in foreign countries. He believes "that the cause of civilization may be greatly encouraged and promoted by travel on the part of teachers, scholars, and investigators, and that, by the study and comparison of national manners and customs, and of political, social, religious, and economic institutions of foreign countries, they will become better qualified to teach and to take part in the instruction and education of the people of their own nation." In the selection of beneficiaries of the Kahn Foundation preference is given to professors of American colleges or universities and, as a rule, the itinerary is expected to involve an absence from America of at least a year. The limited size of the fund does not permit the granting of more than two or three fellowships each year.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of Smithsonian, 1846.....	\$515, 169. 00
Residuary legacy of Smithsonian, 1867.....	26, 210. 63
Deposit from savings of income, 1867.....	108, 620. 37
Bequest of James Hamilton, 1875.....	\$1, 000
Accumulated interest on Hamilton fund, 1895.....	1, 000
	<hr/> 2, 000. 00

Bequest of Simeon Habel, 1880.....	500. 00
Deposits from proceeds of sale of bonds, 1881.....	51, 500. 00
Gift of Thomas G. Hodgkins, 1891.....	200, 000. 00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....	8, 000. 00
Deposit from savings of income, 1903.....	25, 000. 00
Residuary legacy of Thomas G. Hodgkins, 1907.....	7, 918. 69
Deposit from savings of income, 1913.....	636. 94
Bequest of William Jones Rhees, 1913.....	251. 95
Deposit of proceeds from sale of real estate (gift of Robert Stanton Avery), 1913	9, 692. 42
Total amount of fund in the United States Treasury.....	955, 500. 00

OTHER RESOURCES.

Registered and guaranteed bonds of the West Shore Railroad Co., part of legacy of Thomas G. Hodgkins (par value).....	42, 000. 00
Total permanent fund	997, 500. 00

There were originally four pieces of real estate bequeathed to the Institution by the late R. S. Avery, but during the year one of these pieces and a part of another were sold and the proceeds added to the permanent fund. The real estate owned by the Institution is free from taxation and yields a nominal rental.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$92,870.74, was derived as follows: Interest on the permanent foundation, \$58,375.12; contributions from various sources for specific purposes, \$16,575.50; and from other miscellaneous sources, \$17,920.12; all of which was deposited in the Treasury of the United States to the credit of the current account of the Institution.

With the balance of \$33,060.09 on July 1, 1912, the total resources for the fiscal year amounted to \$125,930.83. The disbursements which are given in detail in the annual report of the executive committee, amounted to \$92,289.43, leaving a balance of \$33,641.40 on deposit June 30, 1913, in the United States Treasury.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1913:

International exchanges	\$32, 000
American ethnology	42, 000
Astrophysical Observatory	13, 000
National Museum:	
Furniture and fixtures.....	50, 000
Heating and lighting	50, 000
Preservation of collections	300, 000
Books	2, 000
Postage	500
Building repairs	10, 000

National Zoological Park.....	100,000
Bridge over Rock Creek, National Zoological Park.....	20,000
International Catalogue of Scientific Literature.....	7,500
Total.....	627,000

In addition to the above specific amounts to be disbursed by the Institution, there was included under the general appropriation for public printing and binding an allotment of \$74,900 to cover the cost of printing and binding the annual report and other Government publications issued by the Institution, and to be disbursed by the Public Printer.

RESEARCHES AND EXPLORATIONS.

The Smithsonian Institution has continued to carry on field work in various lines throughout the world by means of small allotments from its funds. It has also accomplished a great deal in the way of exploration and research through the generosity of friends of the Institution, who have contributed funds for special work or provided opportunities for participation in explorations which they had undertaken personally or through the aid of others. Each year, however, the Institution is obliged to forego opportunities for important investigations through lack of sufficient funds.

I can here only briefly mention some of the explorations and researches in progress during the past year. Accounts of activities connected with the Astrophysical Observatory, the Bureau of American Ethnology, and the United States National Museum are given in other parts of this report by those in direct charge of those branches of the Institution.

LANGLEY AERODYNAMICAL LABORATORY.

At a meeting of the Board of Regents on May 1, 1913, the following resolutions were adopted:

Whereas the Smithsonian Institution possesses a laboratory for the study of questions relating to aerodynamics, which has been closed since the death of its director, the late Dr. S. P. Langley, formerly Secretary of the Smithsonian Institution; and

Whereas it is desirable to foster and continue, in the Institution with which he was connected, the aerodynamical researches which he inaugurated;

Resolved, That the Board of Regents of the Smithsonian Institution hereby authorizes the Secretary of the Institution, with the advice and approval of the executive committee, to reopen the Smithsonian Institution laboratory for the study of aerodynamics and take such steps as in his judgment may be necessary to provide for the organization and administration of the laboratory on a permanent basis.

That the aerodynamic laboratory of the Institution shall be known as the Langley Aerodynamical Laboratory.

That the functions of the laboratory shall be the study of the problems of aerodynamics, particularly those of aerodynamics, with such research and experimentation as may be necessary to increase the safety and effectiveness of

aerial locomotion for the purposes of commerce, national defense, and the welfare of man.

That the secretary is authorized to secure, as far as practicable, the co-operation of governmental and other agencies in the development of aerodromical research under the direction of the Smithsonian Institution.

The Regents also authorized the secretary to appoint an advisory committee; to add, as means are provided, other laboratories and agencies; to group them into a bureau organization; and to secure the cooperation with them of the Government and other agencies.

In accordance with the above general plan an advisory committee was organized at a meeting convened at the Institution on May 23, 1913. The official status, organization, agencies, resources, and facilities of this committee are set forth in a statement reprinted in the appendix to the present report.

In preparing plans for carrying forward investigations in various lines a study is being made of researches in progress in other countries, and an allotment has been made from the Hodgkins fund for the maintenance, in part, of the laboratory.

STUDIES IN CAMBRIAN GEOLOGY AND PALEONTOLOGY.

During the field season of the fiscal year 1912-13, or the spring and summer of 1913, I continued my geological work in the Canadian Rockies. A month was spent in the Robson Park district of British Columbia, and Jasper Park, Alberta, our camp being on the continental divide near Berg Lake, northwest of the Yellowhead Pass, through which the Grand Trunk Pacific and Canadian Northern Railways have been built.

Considerable collections of fossils were made at several localities, photographs were taken, and several places in the geological section studied in 1912 were examined. This was rendered necessary by reason of my having been driven out of the region by continued rain and snow storms the previous year.

From the Robson district I went to Burgess Pass, north of Field, British Columbia, and worked at the Middle Cambrian fossil quarry until late in the season. Both in the Robson district and also at Burgess Pass I was assisted by my two sons, Sidney and Stuart, who have had many years' experience in field work in the Rocky Mountains. Mr. R. D. Mesler, of the United States National Museum, spent nearly the entire field season collecting at Burgess Pass. Special effort was made to finish collecting at this famous locality, and at the close of the field season a collection of several thousand specimens weighing over two and a half tons was shipped to Washington.

GEOLOGICAL SURVEY OF PANAMA.

A plan has been formulated and some progress has been made in certain lines of field work for a geological survey of Panama, under

the joint auspices of the Isthmian Canal Commission, the United States Geological Survey, and the Smithsonian Institution, and an allotment has been made from the Institution's funds toward the expenses of such investigation. The general plan of the survey comprises a systematic study of the physiography, stratigraphy and structural geology, geologic history, geologic correlation, mineral resources (including coal, oil, and other fields), petrography and paleontology of the Canal Zone, and of as much of the adjacent areas of the Isthmian region as is feasible. In this survey an opportunity is afforded for working out in detail the succession of the geologic formations and the study of the structure, petrography, and paleontology of a Central American area such as has never before existed, and probably never will be realized again. It is possible to make and properly characterize a standard geologic section of this part of the world, one with which the more obscure exposures of adjacent areas may be compared. There is already nearly completed a section of each side of the Culebra Cut in a horizontal scale of 1:5,000, vertical scale 1:2,500; and a general section has been made from the Atlantic to the Pacific, with collections from every fossiliferous exposure seen. A basis has been practically determined for the intercorrelation of the formations across the Isthmus and for correlation with the Gulf States, also with certain formations in some of the West Indian Islands.

Upon the completion of this survey the Institution will publish a general account of the work accomplished, and later it is planned to print a detailed report of the geological data of the Isthmus and adjoining regions.

BIOLOGICAL EXPEDITIONS IN AFRICA.

Rainey African expedition.—The Paul J. Rainey expedition in British East Africa came to a successful close in February, 1912. The collections, numbering 5,750 large and small mammals, 400 birds, 2,000 reptiles, and 500 miscellaneous specimens, included a large number of new genera and species since described in the publications of the Institution and the National Museum. During this expedition Mr. Edmund Heller, of the National Museum, who had previously served as naturalist on the expedition under Col. Roosevelt, was the guest of Mr. Rainey, who provided him all the native assistants that he could use, and accorded him perfect freedom as regards choice of collecting ground. Mr. Heller was thus able to visit the exact regions from which material was most needed to supplement that procured by the previous expedition. After studying the mammals in the British Museum, Mr. Heller reports that the United States National Museum now has the finest series of East African mammals in the world. Eighty lions were secured on the expedition, which more than tripled the highest previous record for Africa.

The Childs Frick Expedition.—As mentioned in my last report, Dr. Edgar A. Mearns, United States Army, associate in zoology in the National Museum, who had served on the expedition under Col. Roosevelt, accompanied Mr. Childs Frick, of New York, on a hunting and collecting trip in the territory north of that visited by Col. Roosevelt and Mr. Rainey, covering at the same time certain parts of Abyssinia, northern British East Africa, and the country lying about Lake Rudolf. The expedition ended in September, 1912. The collections as a whole embraced plants, mammals, birds, reptiles, batrachians, fishes, mollusks, crustaceans, and other invertebrates. A part of the large collection of birds obtained by this expedition is deposited in the National Museum.

EXPLORATIONS IN BORNEO.

Abbott Borneo expedition.—Through the generosity of Dr. W. L. Abbott, who for many years was engaged in natural history and ethnological investigations in the Malay Archipelago, a fund has been provided for natural history field work in Dutch East Borneo.

Nothing has been published concerning this practically unknown region, and the National Museum had no collections from East Borneo, although there were a few from the west and south coasts of Borneo. During the past year Mr. Raven, in charge of this exploration, succeeded in securing a very interesting series of the characteristic mammals of the country, such as oranges, deer, wild pigs, squirrels and smaller rodents, and other interesting species.

Dr. Streeter's exploration in Borneo.—Mr. Daniel Denison Streeter, jr., of Brooklyn, having offered his services as a collaborator in zoology of the National Museum, sailed from New York on April 4, 1912, and returned December 24, 1912. Some of his thrilling experiences in the interior of Borneo are described in his interesting report to the Institution. He passed from Sarawak into Dutch Borneo by ascending the Rejang River and crossing the mountains on the dividing line to the Kajan River. He then ascended to the head of this river and crossed another range to the headwaters of the Mahakam River, which he descended to the Strait of Macassar. During his trip he secured some interesting collections of mammals, reptiles, and anthropological specimens, part of which have been received by the Museum, but many additional specimens were necessarily left behind in the mountains and may not be recovered.

In describing his journey Mr. Streeter writes:

Arriving at Kuching, the capital of the Kingdom of Sarawak, in north-western Borneo. I apprised the officials of my plan to cross Borneo. They helped me with every means in their power, although they told me that no man had ever yet been across Borneo, and that they did not think it possible for me to do it. * * * I crossed a bay 200 miles wide in a Chinese junk to the

mouth of the Rejang River. Here I engaged three Malays and their canoe to take me 80 miles up the river to the island of Sibn. * * * A little Malay river steamer arrived and took me 90 miles farther up the river—as far as it could go. At this head of navigation is a little native town called Kapit, and here I again took to dugout canoes, this time for good and all. * * * It took me two months to ascend this river to its headwaters. I collected specimens of reptiles and mammals, together with interesting anthropological specimens, took photographs of all kinds, studied the natives, the rivers, the weather, vegetable life in general, made notes on everything, and mapped my course as accurately as I could with the instruments in my possession. * * * I crossed the main range of mountains forming the backbone of Borneo to the headwaters of the Kajan River. I estimate the altitude of the pass through which I crossed the mountains at a little over 3,000 feet. * * * [He then proceeded] in dugout canoes down one branch of the Kajan River and up the main river for several days to the immense village of Long Nawong. This village comprises about 3,000 souls, ruled by a native rajah, who visited me and with whom I exchanged presents. Here I set out with one canoe and five head-hunters as paddlers and continued up the Kajan River. A flood arose, my canoe went to the bottom, and we had to swim for shore. I saved my rifle and my tin box of maps, papers, diaries, and notes.

Continuing on foot up the river we fell in with a party of 40 head-hunters of the Bahau Tribe and I arranged to travel with them, sending back my five Kajan paddlers. With this Bahau troupe I continued up the Kajan River to its headwaters and over another range of mountains to the headwaters of the Mahakam River. * * * After losing my collection I immediately began a second collection, and this assumed the proportions of the first as I proceeded. When within about 500 miles of the mouth of the Mahakam River I came to the first outpost of civilization, the Dutch military post of Long Iram, in charge of a Dutch captain and a company of native Javanese. Upon hearing my story the captain promised to send a military expedition up into the interior, where the Dutch had never been before, and try and secure the outfit which I had left at these native villages. * * * I boarded a little flat-bottomed Malay river steamer, which * * * floated on down the river to the coast.

LYMAN SIBERIAN EXPEDITION.

The expedition to the Altai Mountains, which was financed by Dr. Theodore Lyman, of Cambridge, Mass., as mentioned in my last report, returned to Washington September 16, 1912. Mr. Ned Hollister, a naturalist of the National Museum, accompanied Dr. Lyman. The expedition resulted in securing 350 mammals for the National Museum and 300 birds for the Museum of Comparative Zoology, Cambridge. The region covered was in the Kurai district, Government of Tomsk. The mammal collection is one of the most important received in recent years, as the region had not been represented in the Museum, and the fauna was of special interest on account of its close relationship with that of North America.

ANTHROPOLOGICAL STUDIES IN SIBERIA AND MONGOLIA.

With the view of securing further information as to the origin of the race that peopled America, a visit was made to certain portions of

Siberia and Mongolia by Dr. Hrdlička, of the National Museum, during the summer of 1912. This work was undertaken partly under the auspices of the Smithsonian Institution and partly in the interest of the Panama-California Exposition of San Diego.

Besides field observations made by Dr. Hrdlička, an examination was made of the anthropological collections in the various Siberian museums in the region covered. He saw or was told of thousands upon thousands of burial mounds, or "kourgans," dating from the present time back to the period when nothing but stone implements were used by man in those regions. And he saw and learned of numerous large caverns, particularly in the mountains bordering the Yenisei River, which yield human remains and offer excellent opportunities for investigation.

A brief account of Dr. Hrdlička's studies is given by him in a pamphlet published in the Smithsonian Miscellaneous Collections, in which he says:

In regard to the living people, the writer had the opportunity of seeing numerous Burlats, representatives of a number of tribes on the Yenisei and Abakan Rivers, many thousands of Mongolians, a number of Tibetans, and many Chinese, with a few Manchurians. * * * Among all these people there are visible many and unmistakable traces of admixture or persistence of what appears to have been the older population of these regions, pre-Mongolian and especially pre-Chinese, as we know these nations at the present day. Those representing these vestiges belong partly to the brachycephalic and in a smaller extent to the dolichocephalic type, and resemble to the point of identity American Indians of corresponding head form. * * *

The physical resemblances between these numerous outcroppings of the older blood and types of northeastern Asia and the American Indian can not be regarded as accidental, for they are numerous as well as important, and can not be found in parts of the world not peopled by the yellow-brown race; nor can they be taken as an indication of American migration to Asia, for emigration of man follows the laws of least resistance or greatest advantage, and these conditions surely lay more in the direction from Asia to America than the reverse.

In conclusion, it may be said that from what he learned in eastern Asia, and weighing the evidence with due respect to other possible views, the writer feels justified in advancing the opinion that there exist to-day over large parts of eastern Siberia, and in Mongolia, Tibet, and other regions in that part of the world, numerous remains, which now form constituent parts of more modern tribes or nations, of a more ancient population (related in origin, perhaps, with the latest paleolithic European), which was physically identical with and in all probability gave rise to the American Indian.

BIOLOGICAL SURVEY OF THE PANAMA CANAL ZONE.

The biological survey of the Panama Canal Zone, organized by the Institution in 1910, was brought to a close during the past year as far as field work was concerned, and some of the results have been published. The natural history collections made by the survey have

added very valuable material to the National Museum series of mammals, birds, fishes, reptiles, and amphibians, land and fresh-water mollusks, flowering plants and ferns, and specimens of microscopic plant and animal life.

ANTHROPOLOGICAL STUDIES IN PERU.

During the past year a second trip was made to Peru by Dr. Hrdlička in continuation of the brief but very interesting researches made by him in that country in 1910. The principal objects of the trip were the mapping out as far as possible of the anthropological distributions of the prehistoric Peruvian, more particularly the coast people; the determination of the physical type of the important Nasca group of people, which represent one of the highest American cultures; further inquiry as to man's antiquity on the west coast of South America; and the extension of Dr. Hrdlička's researches on pre-Columbian pathology. Important collections were made for the National Museum, as well as for the Panama-California Exposition at San Diego. A very perceptible change for the worse was observed in the state of preservation of the ancient remains, both skeletal and archeological. Dr. Hrdlička reports:

The major part of the old population of the extensive coast region were found everywhere to belong to the brachycephalic type, intimately related to the Maya-Zapotec type in the north. The Nasca people were one of the purest groups belonging to this type. Wherever they lived these people of the Peruvian coast were wont to practice, more or less, the anteroposterior head deformation. They have spread along the valleys to the foothills of the Cordillera, and have probably in some instances penetrated into the mountains. Meanwhile, however, they became in many though not all localities more or less mixed, or rather mingled, with dolicho or near dolichocephalic elements which came from or across the mountains.

As to man's antiquity, the results were wholly negative; no trace of man of geological age, nor even of an ancient man of the present epoch, were discovered.

The density of the pre-Columbian population was in some localities greater, in others probably less, than at the present time.

As to pathology, the people of the mountains were found to have been much healthier than those of the coast. The most common disease leaving its traces on the bones in ancient Peru was arthritis. In strictly pre-Columbian cemeteries there was no rachitis, syphilis, tuberculosis, or cancer. Wounds of skull were very common. In the mountains numerous interesting instances of trepanation were discovered.

Further explorations in the mountainous parts of Peru are urgent.

RESEARCHES UNDER THE HODGKINS FUND.

As mentioned in my last report, a limited grant was made from the Hodgkins fund for carrying on certain observations on nocturnal radiation at various altitudes. The results of this research, as also of several other lines of investigation in connection therewith, pro-

vided for by an additional grant, are discussed on another page by Mr. Abbot in his report on the Astrophysical Observatory. There was also allotted from the Hodgkins fund a grant for carrying on aeronautical researches in connection with the Langley Aerodynamical Laboratory, discussed in other paragraphs.

There was in press at the expense of this fund during the year a paper by Dr. Leonard Hill and associates, discussing the results of important researches made by them in London on the influence of the atmosphere of crowded places upon our health and comfort.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

In order to afford an opportunity for American biologists to study marine life under exceptionally favorable facilities, the Institution for 20 years past has maintained a table at the Naples Zoological Station. Investigators are assigned the use of this table for stated periods on the recommendation of an advisory committee appointed for the purpose. The authorities of the station have on several occasions courteously allowed more than one occupant of the table when there was overlapping in periods of appointment.

During the year covered by the present report Mr. Sidney I. Kornhauser and Mr. Edward C. Day, both of Harvard University, have pursued studies at the Smithsonian table.

THE HARRIMAN TRUST FUND.

Under a special trust fund, established by Mrs. E. H. Harriman, for his investigations in natural history and ethnology, Dr. C. Hart Merriam has equipped two offices, the principal one at Washington, D. C., the other at Lagunitas in west central California, a convenient center for field work on the Pacific coast and a favorable place for the preparation of results.

His principal work during the year has been a continuation of a monographic study of the American bears. Assistance in the way of the loan of specimens has been rendered by all of the larger museums of America, including the Government museums of Canada, at Ottawa and Victoria, and by a number of sportsmen and hunters, who have placed their private material at his disposal. This has been still further augmented by the purchase of specimens, mainly skulls, of rare and little known species, some of which are the only ones in existence. In view of the fact that several species of our large bears are already extinct and others on the verge of extinction, the great value of this material is obvious.

In connection with the study of the big bears a new method has been developed, namely, an intensive study of teeth from photographs. Owing to the large size of bear skulls, it is impossible to

bring the teeth of several individuals near enough together to admit a direct comparison. To obviate this difficulty, the teeth have been photographed natural size. Series of these photographs arranged closely side by side permit direct critical comparison of a number of specimens at one time, favoring the recognition of resemblances and differences not easily detected from the specimens. This method would seem to be available in the case of other groups of large mammals.

Owing to the desirability of completing the study of the bears as early as possible, but little field work was undertaken. Still, a few tribes of Indians were visited, and half a dozen vocabularies collected, completing the series of vocabularies of the 25 existing linguistic stocks of California and Nevada.

AMERICAN SCHOOL OF ARCHEOLOGY IN CHINA.

At a meeting held at the Smithsonian Institution on January 3, 1913, there was discussed the establishment of an American school of archeology in China. The objects of the school as proposed are: (1) To prosecute archeological research in eastern China; (2) to afford opportunity and facilities for investigation to promising and exceptional students, both foreign and native, in Asiatic archeology; and (3) to preserve objects of archeological and cultural interest in museums in the countries to which they pertain in cooperation with existing organizations, such as the Société d'Ankor, etc.

The management of the affairs of the school was placed in the hands of an executive committee of five, consisting of Dr. Charles D. Walcott, Secretary of the Smithsonian Institution; Mr. Charles Henry Butler, reporter of the United States Supreme Court; Dr. Harry Lane Wilson, of Johns Hopkins University; Mr. Charles L. Freer, of Detroit; and Mr. Eugene Meyer, jr., of New York. The general committee consists of 15 gentlemen especially interested in archeological research in China, with Dr. Walcott as chairman and Mr. Butler as secretary. Arrangements were made for a preliminary survey in the Chinese Republic for the information of the general committee in considering the permanent organization of the proposed school.

PUBLICATIONS.

The publications issued by the Smithsonian Institution and its branches during the last fiscal year made a total of 6,260 printed pages, and the aggregate distribution comprised 182,883 copies of pamphlets and bound volumes.

The Institution accomplishes one of its principal objects, "the diffusion of knowledge," by means of its several series of publications which record results of original researches, accounts of explorations,

the progress achieved in science and industry, and general information in all branches of human knowledge believed to be of value to those interested in the promotion of science and the welfare of man.

The Smithsonian Contributions to Knowledge, in quarto form, and the Smithsonian Miscellaneous Collections, in octavo, are printed at the expense of the Smithsonian fund, and necessarily in limited editions, being distributed chiefly to certain large libraries throughout the world, where they are available for public reference. The Smithsonian Annual Report, however, is printed at the expense of congressional appropriations, and in an edition of several thousand copies, thus permitting its wide distribution. The principal feature of the annual report is a general appendix containing about 30 selected or original memoirs illustrating the more remarkable and important developments in the physical and natural sciences, as well as showing the general character of the operations of the Institution.

In addition to the publications mentioned above, there are several other series of works issued under the direction of the Institution through its various branches or bureaus. These include the Annual Report, and the Proceedings and Bulletin of the National Museum; the Contributions from the National Herbarium; the Annual Report and Bulletins of the Bureau of American Ethnology; and the Annals of the Astrophysical Observatory, all of which are Government publications, being printed through annual allotments by act of Congress.

Smithsonian Contributions to Knowledge.—The chief characteristic of memoirs printed in the Contributions to Knowledge is that they are records and discussions of original investigations and constitute important additions to knowledge. Since the establishment of this series in 1848, about 150 of these memoirs have been published in 35 quarto volumes. The most recent memoir of this series, reviewed in my last report, was the "Langley Memoir on Mechanical Flight," recording the experiments of the late Secretary Langley, which resulted in his successful demonstration of the practicability of aerial navigation with machines heavier than air.

Smithsonian Miscellaneous Collections.—In this series 40 papers were issued, forming parts of five volumes, the titles of which are enumerated in the appendix herewith. Among these numerous papers were two articles by the secretary describing further results of his studies of Cambrian fossils, a bibliography of the geology and mineralogy of tin, and a large number of papers descriptive of results of the Smithsonian African expedition under Col. Roosevelt, the Paul J. Rainey African expedition, and the Smithsonian biological survey of the Panama Canal Zone. There were also in press at the close of the year three additional papers on Cambrian fossils, one of them, in particular, giving an account of the Mount Robson region.

and a paper, as already mentioned, by Dr. Leonard Hill and other investigators of the Physical Laboratory of the London Hospital Medical College, discussing the results of experiments to determine "The influence of the atmosphere on our health and comfort in confined and crowded places." The authors conclude that—

No symptoms of discomfort, fatigue, or illness results, so long as the temperature and moisture are kept low, from air rendered, in the chemical sense, highly impure by the presence of human beings. Such air can be borne for hours without any evidence of bodily or mental depression. * * * Heat stagnation is therefore the one and only cause of the discomfort, and all the symptoms arising in the so-called vitiated atmosphere of crowded rooms are dependent on heat stagnation. The moisture, stillness, and warmth of the atmosphere are responsible for all effects, and all the efforts of the heating and ventilating engineer should therefore be directed toward cooling the air in crowded places and cooling the bodies of the people by setting the air in motion by means of fans. * * * The essentials required of any good system of ventilation are, then: (1) Movement, coolness, proper degree of relative moisture of the air, and (2) reduction of the mass influence of pathogenic bacteria. The chemical purity of the air is of very minor importance and will be adequately insured by attendance to the essentials.

Smithsonian Report.—The completion of the annual report for 1911 was long delayed at the Government Printing Office, awaiting a supply of the quality of paper used in that publication. The general appendix of the volume contained 36 articles of the usual character. The report for 1912 was in type at the close of the fiscal year. The popularity of this work continues unabated, the entire edition each year becoming exhausted very soon after its publication.

National Museum publications.—The publications by the Museum during the year comprised two volumes of Proceedings, pamphlet copies of 96 articles from the Proceedings, two Bulletins, and nine parts of volumes of Contributions from the National Herbarium. An interesting work in press at the close of the year, prepared by Assistant Secretary Richard Rathbun, gives a descriptive account of the building recently erected for the departments of natural history of the United States National Museum. The book is illustrated with 34 plates and, besides a general description of the building, includes special chapters relating to structural details and mechanical equipment.

Zoological nomenclature.—Opinions 52 to 56 rendered by the International Commission on Zoological Nomenclature were published in the usual form. The Institution also continues to aid the work of this commission by providing funds for clerical services in connection with the office of its secretary in this country.

Publications of the Bureau of American Ethnology.—The publications issued by the Bureau of American Ethnology were the Twenty-eighth Annual Report, containing papers on Casa Grande, the antiquities of the upper Verde River and Walnut Creek Valleys, Ariz.,

the linguistics of Algonquian tribes; also Bulletin 52 on early man in South America, and Bulletin 54 on the physiography of the Grande Valley, New Mexico.

The Astrophysical Observatory had completed work on volume of the *Annals of the Observatory* at the close of the year, and it was expected that the distribution of the edition would take place soon after July 1.

Reports of historical and patriotic societies.—In accordance with the national charters of the American Historical Association and the National Society of the Daughters of the American Revolution, annual reports of those organizations were submitted to the Institution and communicated to Congress.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the fiscal year, aggregating \$74,900, were all utilized with the exception of small balances on work in progress at the close of the year. The allotments for the year ending June 30, 1914, are as follows:

For the Smithsonian Institution, for printing and binding annual reports of the Board of Regents, with general appendixes.....	\$10.00
For the annual reports of the National Museum, with general appendixes, and for printing labels and blanks, and for the bulletins and proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half turkey or material not more expensive, scientific books and pamphlets presented to or acquired by the National Museum library.....	37.50
For the annual reports and bulletins of the Bureau of American Ethnology, and for miscellaneous printing and binding for the bureau.....	21.00
For miscellaneous printing and binding:	
International exchanges.....	2.00
International catalogue of scientific literature.....	1.00
National Zoological Park.....	2.00
Astrophysical Observatory (any unexpended balance of 1913 allotment for volume 3 of <i>Annals</i> made available for fiscal year 1914).....	2.00
For the annual report of the American Historical Association.....	7.00
Total.....	76.20

Committee on printing and publication.—The advisory committee on printing and publication under the Smithsonian Institution has continued to examine manuscripts proposed for publication by the branches of the Institution and has considered various questions concerning public printing and binding. Twenty-two meetings of the committee were held during the year and 138 manuscripts were passed upon. The personnel of the committee as now organized are as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Mr. C. G. Abbot, Director of the Astrophysical Observatory; Dr. Frank Baker, Superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the *Smithsonian*.

sonian Institution, secretary of the committee; Mr. F. W. Hodge, ethnologist in charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Distribution of publications.—On August 23, 1912, a law was enacted requiring that all Government publications must, after October 1, be mailed from the Government Printing Office, mailing lists or labels to be forwarded to the superintendent of documents for that purpose. In accordance with the law, the Smithsonian Report and publications of the United States National Museum and the Bureau of American Ethnology have since been distributed direct from the Government Printing Office. The accumulated stock of publications, aggregating about 100,000 volumes and pamphlets from which constant demands had been supplied, was also transferred to the superintendent of documents during the month of September.

Catalogue of publications.—There is in preparation, and nearly ready for press, a complete list of publications of the Institution and its branches. Partial lists have been issued from time to time but no complete catalogue has been published. The present work will contain about 12,000 titles, being practically a table of contents of the entire series of Contributions to Knowledge, Miscellaneous Collections and Annual Reports of the Institution, the Proceedings, Bulletins, and Annual Reports of the National Museum, the Annual Reports and Bulletins of the Bureau of American Ethnology, and the Annals of the Astrophysical Observatory. The catalogue is so arranged as to permit of ready reference to any desired subject or the collective works of any author appearing in the several series.

LIBRARY.

During the year 12,930 volumes and parts of volumes, chiefly on scientific topics, were added to the Smithsonian deposit in the Library of Congress. The additions to the National Museum library numbered 4,062 volumes and pamphlets. Additions were also made to the libraries of the Astrophysical Observatory, the Zoological Park, the Bureau of American Ethnology, and other office libraries, including the aeronautical library, which it is expected will be utilized chiefly in connection with the work of the Langley Aerodynamical Laboratory organized in May, 1913.

The appropriations for the next fiscal year provide an item of \$15,000 for beginning the construction of metal book stacks in the main hall of the Smithsonian building to contain the library of the Bureau of American Ethnology, a part of the National Museum library, and certain other collections of books now stored in places inconvenient for reference.

In the new building of the National Museum four rooms on the ground floor have been provided with steel book stacks and library appliances of the latest design. To these rooms have been transferred works needed in connection with natural history studies, while books relating chiefly to the arts and industries and to American history are retained in the older Museum building, where the collections of those classes remain on exhibition.

ARCHIVES.

During the year some attention was given to improving conditions in the archive room of the Institution, which was very badly overcrowded. This room, on the fourth floor of the Smithsonian building, was thoroughly overhauled and much accumulated material not relating directly to the history of the Institution was removed to other quarters. The set of Smithsonian publications formerly preserved in this room was temporarily removed to the office of the assistant secretary in charge of library and exchanges, thus making space for manuscript material of importance. Two large wooden cases containing papers relating to the internal affairs of the Institution and its branches, together with other documents, were replaced by metal cases containing drawers equipped with uniform cardboard receptacles for papers, and alphabetical guide cards. It was not found possible, however, to complete the transfer of the papers to these receptacles during the year.

The wooden panels in the doors of the wall cases in the room were removed and replaced by glass, so that it is possible to see the contents of the cases without opening them. A case was provided for maps, plans, charts, and other large objects.

Cases were placed in an adjoining room for the reception of duplicate vouchers and other financial papers of the several branches of the Institution.

The large quantity of Schoolcraft papers at present in the custody of the Institution were transferred to uniform file boxes and placed on shelves. These papers are only partially classified.

The archives are now completely accessible, although a large amount of work is still required to put them into thoroughly satisfactory condition. The principal improvements needed are a complete card catalogue of the several classes of papers contained in the room, with indications of the location of each, and a uniform card index of the contents of the bound volumes of official letters, both originals and press copies. A reclassification of a considerable portion of the other archives is also desirable, as well as the completion of the work of transferring papers to the new cases mentioned above.

LANGLEY MEDAL.

In memory of the late Secretary Samuel Pierpont Langley and his contributions to the science of aerodromics, the Board of Regents of the Smithsonian Institution on December 15, 1908, established the Langley medal, "to be awarded for specially meritorious investigations in connection with the science of aerodromics and its application to aviation." The first award of the medal was voted by the Board of Regents on February 10, 1909, to Wilbur and Orville Wright "for advancing the science of aerodromics in its application to aviation by their successful investigations and demonstrations of the practicability of mechanical flight by man." The medal was presented to each of the brothers Wright at a meeting of the board on February 10, 1910.

The second award of the medal was voted on February 13, 1913, to Mr. Glenn H. Curtiss "for advancing the art of aerodromics by his successful development of a hydroaerodrome whereby the safety of the aviator has been greatly enhanced," and to Monsieur Gustave Eiffel "for advancing the science of aerodromics by his researches relating to the resistance of the air in connection with aviation." The presentation of these medals was made on May 6, 1913. This date was selected in order that the ceremonies incident to the presentation might take place in connection with the observance of "Langley Day," which was established by the Aero Club of Washington in 1911, to commemorate the achievement by Mr. Langley on May 6, 1896, of mechanical flight by a heavier-than-air machine propelled by its own power. On May 6, 1911, and again on May 6, 1912, there were exhibition flights of biplanes and monoplanes near Washington. On the afternoon of May 6, 1913, the celebration by the club occurred at the Army War College immediately after the exercises in the Smithsonian building, and consisted of a reception by the Aero Club, followed by hydroaeroplane, biplane, and monoplane maneuvers.

The presentation exercises in the Smithsonian building preceded the unveiling of the Langley memorial tablet and included addresses by Dr. Alexander Graham Bell in presenting the medals, and acceptances by Ambassador Jusserand in behalf of M. Eiffel, and by Mr. Glenn H. Curtiss.

In the course of his address M. Jusserand said:

We have seen France and America vie with each other not only in the conquest of better, greater, and safer liberty from year to year, but also in the producing of more and more momentous inventions, improving the plane of life of the many, reaching less faulty solutions of the great social problems.

Nothing more striking has taken place on these lines than in what concerns the conquest of the air. It is surely appropriate to remember that one of the very first flights ever attempted took place in Versailles, when one of the earliest balloons rose a fortnight after the treaty definitely securing your inde-

pendence had been signed there in 1783. And you all know that Franklin, when asked, What was the good of such an invention, answered, "What is the good of a new-born child?" The child has grown and is rapidly becoming a giant in power. There is no branch of human activity in which France and America have more truly vied with each other than this one, from the memorable day of the *Montgolfière*, so quickly perfected by the French physicist Charles, to our own time.

Mr. Curtiss said in part:

As I look at the Langley models here, it becomes more evident to me than ever before—the merit of these machines and the great work which Mr. Langley did. We now know, as a result of M. Eiffel's laboratory experiments, that the flying planes used by Prof. Langley had a great deal of efficiency, and it is generally known that the Langley machines, as he built them, had more inherent stability than the models which those of us who followed after Langley used in our first flights. I can not say too much in favor and in memory of Prof. Langley.

LANGLEY MEMORIAL TABLET.

On May 6, 1913, the anniversary of the successful flight of the Langley model aerodrome in 1896, the Langley memorial tablet to commemorate the aeronautical work of the late Secretary Langley was unveiled in the Smithsonian building in the presence of many prominent in the development of aviation and a large company of invited guests. The tablet was described in my last report. On the occasion of the unveiling of the tablet a memorial address was delivered by Dr. John A. Brashear, one of Prof. Langley's oldest and most cherished friends, and his warm supporter during his long investigations connected with the subject of aerial flight.

CONGRESSES AND CELEBRATIONS.

The Institution each year receives invitations to numerous scientific congresses and celebrations in the United States and abroad, but as funds are not available for the expenses of delegates, few of the invitations can be accepted. In some instances, however, it is possible to arrange for representation by collaborators of the Institution who are visiting the localities, or by members of the scientific staff of the Institution or its branches who are attending at their own expense.

Zoological Congress.—Dr. Leonhard Stejneger, Dr. Ch. Ward Stiles, and Dr. Herbert Haviland Field were designated to represent the Smithsonian Institution and National Museum and were also designated by the Department of State as delegates on the part of the United States at the Ninth International Congress of Zoology at Monaco, March 25 to 30, 1913.

Applied chemistry.—The opening meeting of the Eighth International Congress of Applied Chemistry was held in Washington on September 4, 1912, with subsequent meetings in New York. Pro

F. W. Clarke was designated to attend the congress as the representative of the Institution. The congress made the Secretary of the Institution one of its honorary vice presidents.

Prehistoric anthropology.—Dr. Aleš Hrdlička, Dr. Charles Peabody, and Dr. George Grant MacCurdy were designated to represent the Smithsonian Institution and the United States at the Fourteenth International Congress of Prehistoric Anthropology and Archeology at Geneva, September 9 to 15, 1912.

Hygiene and demography.—The Fifteenth International Congress on Hygiene and Demography was held in Washington from September 23 to 28, 1912, under the auspices of the Government of the United States, President William Howard Taft serving as honorary president. Your secretary was a member of the local committee on organization, and Mr. W. H. Holmes, of the National Museum, served on the interdepartmental committee on exhibits.

Archeological Congress.—The Third International Congress on Archeology was held at Rome, October 9 to 16, 1912. Upon the nomination of the Smithsonian Institution the Department of State designated Prof. A. L. Frothingham, of Princeton, Prof. George M. Whicher, secretary of the New York Society of the Archeological Institute of America, and Mr. William H. Buckler, president of the Baltimore Society of the Archeological Institute of America, as delegates on the part of the United States at that congress.

Historical studies.—Prof. J. Franklin Jameson, of the American Historical Association, was designated to act as the representative of the Smithsonian Institution at the International Congress of Historical Studies held in London, April 3 to 8, 1913, under the auspices of the British Academy in cooperation with British universities, learned societies, and institutions.

Geological Congress.—Your secretary, as a member of the Twelfth International Congress of Geology, arranged to be at Toronto August 7 to 14, 1913, and was appointed to represent the Carnegie Institution of Washington and the Washington Academy at that congress. Dr. George P. Merrill, head curator of geology in the National Museum, was appointed a representative of the Smithsonian Institution.

Congress of Americanists.—Arrangements have been progressing during the year in connection with the Nineteenth International Congress of Americanists, which has been invited to meet in Washington in 1914, and Mr. W. H. Holmes, Mr. F. W. Hodge, and Dr. Aleš Hrdlička have been appointed an auxiliary committee to represent the Smithsonian Institution in connection with the preliminary details respecting the proposed meeting.

The State education building at Albany was dedicated October 16, 1912, on which occasion the secretary presented the formal con-

gratulations of the Smithsonian Institution, which is specially interested in the city of Albany, for it was there that Joseph Henry, first secretary of the institution, was born in the year 1799, and there Henry began his researches and experiments in electricity which in great measure made possible the wonderful electrical achievements of the present day. "He married the intensity magnet to the intensity battery, the quantity magnet to the quantity battery, discovered the law by which their union was effected, and rendered their divorce impossible." The intensity magnet is that which is to-day in use in every telegraph system. "Henry's oscillating machine was the forerunner of all our modern electrical motors. The rotary motor of to-day is the direct outgrowth of his improvements in magnets."

National Academy of Sciences.—The semicentennial meeting of the National Academy of Sciences was held at the Smithsonian Institution April 22 to 24, 1913. The exercises included an address of welcome by Dr. Ira Remsen, president of the academy, and addresses on "The Relation of Science to the Higher Education in America," by President Arthur T. Hadley, of Yale University; "International Cooperation in Research," by Dr. Arthur Schuster, of London; "The Earth and Sun as Magnets," by Dr. George E. Hale, of the Mount Wilson Solar Observatory; and "The Structure of the Universe," by J. C. Kapteyn, of Groningen. At the White House, President Woodrow Wilson and Dr. R. S. Woodward participated in the ceremony of the presentation of medals awarded by the academy. The Watson medal was awarded to Prof. J. C. Kapteyn, the Draper medal to M. Henri Deslandres, the Agassiz medal to Dr. Johan Hjort, and the Comstock prize to Prof. R. A. Millikan. There were various social functions in connection with the meeting, including an evening reception in the natural history building of the National Museum. On the occasion of the meeting of the academy there was published "A History of the First Half Century of the National Academy of Sciences, 1869-1913," prepared and edited by Dr. Frederick W. True, assistant secretary of the Smithsonian Institution.

Imperial Russian Museum.—On the occasion of the fiftieth jubilee of the Imperial Moscow and Rumiantsef Museum your secretary was elected an honorary member of that institution.

GEORGE WASHINGTON MEMORIAL BUILDING.

In the public buildings bill approved by the President on March 4, 1913, permission was granted to the George Washington Memorial Association to erect a building on the square formerly occupied by the Pennsylvania railway station in Washington. The preamble of the original bill (S. 5494), as passed by the Senate April 15, 1912, defined the objects of the Memorial Building as follows:

To provide a site for the erection of a building to be known as the George Washington Memorial Building, to serve as the gathering place and headquarters of patriotic, scientific, medical, and other organizations interested in promoting the welfare of the American people.

Whereas George Washington, on July ninth, seventeen hundred and ninety-nine, said: "It has been my ardent wish to see a plan devised on a liberal scale which would spread systematic ideas through all parts of this rising Empire," and it was Washington's wish to materially assist in the development of his beloved country through the promotion of science, literature, and art, and with the firm conviction that "knowledge is the surest basis of public happiness"; and

Whereas the changing conditions that time has brought require new methods of accomplishing the results desired by Washington and now a necessity of the American people; and

Whereas at the present time there is not any suitable building in the city of Washington where large conventions or in which large public functions can be held, or where the permanent headquarters and records of national organizations can be administered; and

Whereas a building should be provided in which there shall be a large auditorium, halls of different sizes where all societies pertaining to the growth of our best interests can meet, and such as it is deemed desirable may have permanent headquarters; and

Whereas the George Washington Memorial Association is now engaged in obtaining funds for the erection and endowment of a building suitable for the purposes above set forth, to be known as the George Washington Memorial Building: Therefore * * *

The law as passed by Congress and approved by the President March 4, 1913, was as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

SEC. 10. That a building is hereby authorized to be erected in the District of Columbia, to be known as the George Washington Memorial Building.

The control and administration of said building, when erected, shall be in the Board of Regents of the Smithsonian Institution.

The George Washington Memorial Association is authorized to erect said building in accordance with plans to be procured by said association and to be approved by the Commission of Fine Arts, said building to be fireproof, faced with granite, and to cost not less than \$2,000,000; it shall have an auditorium that will seat not less than six thousand people, and such other smaller halls, reception rooms, office rooms, and so forth, as may be deemed necessary to carry out the purposes for which the building is erected. And the said George Washington Memorial Association shall in addition provide a permanent endowment fund of not less than \$500,000, to be administered by the Board of Regents of the Smithsonian Institution, the income from which shall, as far as necessary, be used for the maintenance of the said building.

Permission is granted the George Washington Memorial Association to erect said building in the north end of the reservation known as Armory Square, bounded by Sixth and Seventh Streets west and B Street north and B Street south. The south front of said building is to be on a line with the south front of the new National Museum Building, in the north end of the Smithsonian Park; and the said land is hereby set apart for that purpose: *Provided*, That the actual construction of said building shall not be undertaken until the sum

of \$1,000,000 shall have been subscribed and paid into the treasury of the George Washington Memorial Association: *And provided further*, That the erection of said George Washington Memorial Building be begun within a period of two years from and after the passage of this act, and this section shall be null and void should the George Washington Memorial Association fail to comply with the provisions thereof which are conditions precedent to the authorization herein granted.

Said building may, among other purposes, be used for inaugural receptions and special public meetings authorized by Congress.

Congress may alter, amend, add to, or repeal any of the provisions of this section.

The need in Washington of such a structure as here authorized has been urged on many occasions in public meetings throughout the country. The Regents of the Smithsonian Institution have expressed their willingness to administer it when completed. It will be a gathering place and headquarters for patriotic, scientific, medical, and other organizations interested in promoting the welfare of the American people and the development of the country in science, literature, and art.

Plans for the building are being made, and it is hoped that the work of construction will begin within the time limit set by the law.

THE NATIONAL MUSEUM.

The operations of the National Museum are discussed with such detail by Assistant Secretary Rathbun in the appendix to the present report that I need here refer only to some of the more important features of the year.

The completion of the natural history building, with its spacious well-lighted halls, has made it feasible to vastly improve the extensive exhibits of the departments of anthropology, biology, and geology installed therein; while objects pertaining to the industrial arts and to American history are now given ample exhibition room in the older building.

In the zoological halls of the new building are exhibited a number of groups of animals which are noteworthy examples of the art of taxidermy, some of these groups being made up of specimens received from the Smithsonian African expedition under Col. Roosevelt. And likewise in the halls devoted to anthropological exhibits are shown a number of racial groups of mankind, including several representing Indians of various tribes engaged in their native games and mechanical occupations, which seem particularly attractive to visitors.

The department of arts and industries for many years had been checked in its development by what seemed to be the more urgent demand for space for natural history exhibits. Many large and interesting collections illustrative of the industrial arts, acquired

by the Museum during the last 30 years, had therefore necessarily been held in storage, but the transfer of objects of natural history to the new building has now released large halls for the installation of instructive collections pertaining to art textiles, silk, wool, and cotton manufactures, to arms and armor, ceramics, mineral technology, and to some other general manufacturing industries, including an exposition of the processes and of the raw materials and finished products.

The responses received from requests for objects desired to complete particular series in this department are very gratifying and indicate a public interest in its still broader development. The educational character of these exhibits, and, in fact, of all objects displayed in the National Museum, is kept constantly in mind. Thus, a small number of specimens or objects well arranged is found to be far better than a large display where the educational feature is overshadowed by what may be termed a picturesque method of installation. The style of cases, the color of the background, and many other details must be carefully studied and worked out with a view to proper harmony in every respect.

There has been added to the Museum collections an approximate total of 302,133 specimens and objects, as compared with 238,000 during the year preceding. The accessions included 140,015 botanical, 113,509 zoological, and 14,716 paleontological specimens, besides a number of paintings, art textiles, useful plant products, and objects illustrative of American history.

In geographical range the accessions covered practically the entire world, ethnological, archeological, biological, and geological objects being received from all parts of North and South America, from Alaska, Siberia, China, Oceanica, Dutch East Indies, Africa, and other lands, the results in large measure of explorations undertaken by the Smithsonian Institution and National Museum either directly or in cooperation with private individuals or Government departments. Among individuals who have thus served the Museum during the year, some of whom I have already mentioned, were Mr. Childs Frick, who made collections, especially of birds, in Africa; Dr. Theodore Lyman, who hunted animals in the Altai Mountains in Asia; Dr. W. L. Abbott, who continued his collecting work in Kashmir and generously provided for field work in Borneo; Mr. D. D. Streeter, jr., who explored the interior of Borneo; Mr. George Mixer, who visited Lake Baikal in Siberia; and Mr. Copley Amory, jr., who made collections of mammals and of fossil species in Alaska.

One of the interesting additions to the mammal division was a mounted specimen and skeleton of the rare okapi of Africa. Several noteworthy collections of fossil invertebrates were also received, and among accessions of vertebrate remains were a large series of

mammals from the Fort Union beds of Montana, and many genera and species from recently uncovered Pleistocene cave deposits in Maryland; also a series of bones from the Yukon territory containing the first evidence of the former extension of the range of the camel beyond the Arctic Circle.

The most important permanent addition to the division of history was the gift by Mr. Eben Appleton of the "Star Spangled Banner," which he had allowed to be exhibited as a loan since 1907. This great flag, about 30 feet square, is the one that waved over Fort McHenry in September, 1814, and inspired Francis Scott Key to write the national anthem.

The division of prehistoric anthropology has received several large and valuable accessions of skeletal remains during recent years, one of the most important recent additions being obtained in Mongolia where the curator was engaged in studies to discover the probable origin of the American Indians.

The National Gallery of Art was enriched by the gift of 12 paintings, 7 of them presented by Mr. William T. Evans, and by 18 paintings and 2 marble sculptures received as loans from friends of the Gallery.

It has been the custom for many years to distribute to schools and colleges for teaching purposes, or to exchange with other institutions, such duplicate natural history specimens as are no longer needed for scientific study by the Museum staff. During the past year about 30,000 specimens were thus utilized for educational purposes or to secure new material for the Museum.

The number of visitors to the new building during the year was 261,636 on week days and 58,170 on Sundays, the largest attendance being 13,236 on March 5, the day following the inauguration of the President.

The publications issued by the Museum included about 100 papers from the Proceedings and a number of Contributions from the National Herbarium, besides two completed volumes of Proceedings and two Bulletins. The total distribution of earlier and current publications was 71,600 copies.

Mention is made on another page of the fitting up of rooms in the new building for the accommodation of such portions of the Museum library as pertain chiefly to natural history subjects, books on other topics being retained in the older buildings. The total contents of the library at the close of the year was 43,692 volumes and 72,042 papers of all kinds.

Meetings of various scientific organizations were held in the Museum auditorium and adjacent rooms, and there were several formal receptions which are noted in the report of the assistant secretary.

BUREAU OF AMERICAN ETHNOLOGY.

Ethnological researches have been continued in accordance with law, among the American Indians and the natives of Hawaii, including the excavation and preservation of archeological remains. The systematic researches carried on by eight ethnologists of the regular staff and by specialists not officially connected with the bureau covered a wide range of field work and office studies, which are described in such detail in the appendix by the ethnologist-in-charge, that I need here to review but briefly some of the most important activities of the year. For the preparation of a memoir on The Culture History of the Aborigines of the Lesser Antilles, Dr. Fewkes visited Trinidad, Barbados, St. Vincent, and other islands of the West Indies, where he made extensive excavations of shell-heaps, particularly in Trinidad and St. Vincent, yielding very interesting collections of pottery and other objects, and carried on archeologic studies which proved to be especially important in throwing light on the material culture of the former aborigines of the coast adjacent to South America.

Studies were continued in the investigation of Indian population, a research covering the whole period from the first occupancy of the country by white people to the present time, and including the entire territory from the Rio Grande to the Arctic Ocean. A monograph in preparation on this subject includes chapters on notable epidemics, vital statistics, and race admixture.

Further interesting studies were made in New Mexico in preparation of a memoir on the philosophy, anthropic worship and ritual, zoic worship, social customs, material culture, and history of that interesting and conservative Pueblo people known as the Tewa Indians.

A large amount of additional material was also obtained concerning the languages, myths, and legends of the Fox Indians and other Algonquian tribes, and on the ceremonies and rituals of the Osage and Pawnee Indians.

Progress has been made in the preparation of the Handbook of American Indian Languages and the Handbook of American Archeology. There is also in preparation a Handbook of Aboriginal Remains East of the Mississippi.

Some of the results of investigations conducted by the bureau in cooperation with the School of American Archeology are described in three memoirs, now published or ready for publication, on The Physiography of the Rio Grande Valley, New Mexico, in Relation to Pueblo Culture, The Ethnobotany of the Tewa Indians, and the Ethnozoology of the Tewa Indians, and there is also in process of completion in this connection a manuscript entitled "An Introduction to the Study of the Maya Hieroglyphs."

The Handbook of American Indians, completed by the bureau a few years ago, has increased the popular interest in our aborigines to such an extent that the bureau is considering the feasibility of issuing a series of treatises devoted to the Indians of the respective States, and as a beginning for such a series there is in preparation a Handbook of the Indians of California.

Among the publications issued during the year may be mentioned the Twenty-eighth Annual Report; a reprint of the Handbook of American Indians North of Mexico, ordered by resolution of Congress; a bulletin on Early Man in South America; portions of Part 2 of the Handbook of American Indian Languages; and a bulletin on Chippewa Music.

The scope of the work undertaken by the bureau is necessarily limited by the funds available. Among investigations that are specially desirable to extend may be mentioned the exploration and preservation of antiquities, including the cliff dwellings in the arid region; ethnological researches in Alaska; the extension of ethnological investigations among the tribes of the Mississippi drainage; and excavation and study of archeological remains in the South and West.

INTERNATIONAL EXCHANGES.

The work of the International Exchange Service shows a steady gain from year to year. During the last 15 years the weight of matter handled has increased from 317,883 pounds in 1898 to 593,969 pounds in 1913, and the total number of packages has increased during that period from 84,208 in 1898 to 338,621 in 1913. As compared with the year 1908, 66 per cent more packages were handled in 1913 and 678 more boxes were dispatched, but by practicing various economies and improving methods the increased work has been accomplished without an increase in the annual appropriation.

In addition to the international exchange of publications between Governments and institutions of learning, the service has from time to time been called upon by foreign Governments and societies to secure information on particular subjects. To answer such inquiries has sometimes required much correspondence. Thus, in a recent instance, the minister of public works and mines in a distant country sought information through the Department of State on laws and regulations with respect to the boring, mining, and storage of petroleum in the United States, a class of data which the Smithsonian Institution was able to obtain only by writing to the principal States concerned in that industry.

In order to simplify the shipment of exchanges to the Union of South Africa arrangements have been made whereby packages are now shipped in bulk to the Government Printing Works at Pretoria for distribution instead of being sent to miscellaneous addresses in

the various provinces of the Union. This method will effect a saving to the Institution in freight charges and improve the service with South Africa. A similar method would be very advantageous with the Commonwealth of Australia and is now under consideration by the Australian House of Representatives and the chairman of the library committee of that country.

In Egypt there has been organized the Government publications department at Cairo, to which consignments for distribution there are now being forwarded. In Mexico a service of exchanges has been established in the department of public works.

Full sets or partial sets of United States official documents are now sent to 92 foreign depositories, the Province of Bombay, the Corporation of Glasgow, Finland, British Guiana, the Free City of Lubeck, and the Province of Madras having been added to the list during the year. There has also been carried on since 1909, through the Exchange Service, an interparliamentary exchange of official journals with legislative chambers agreeing thereto, 100 copies of the daily issue of the Congressional Record being provided for that purpose. Thirty-two countries have so far agreed to this exchange of their official journals.

NATIONAL ZOOLOGICAL PARK.

The National Zoological Park was established by act of Congress in 1890 "for the advancement of science and the instruction and recreation of the people." It was the outgrowth of a small collection of living animals which for several years had been assembled in low sheds and small paddocks adjacent to the Smithsonian building, where they were kept primarily for scientific study, though they were likewise a constant source of interest to the public. There was at once a rapid increase in the size of this collection when the animals were removed to the spacious grounds provided for them in the beautiful Rock Creek Valley, and it is evident from its increasing popularity during the last 23 years that the establishment of this great zoological park has been regarded as a wise investment of public funds.

The popular interest in the park has continued to be very great. On Sundays and holidays the walks and buildings are crowded. During the past year the number of visitors was 633,526, and the daily average in the month of March, 1913, was 3,900. One hundred and forty-two classes, schools, etc., numbering 5,579 pupils, visited the park during the year with the definite purpose of studying the animals.

The interests of science have also been primary objects of attention in the administration of the park. A number of species of

American animals which were rapidly becoming extinct are here preserved in appropriate natural surroundings. In a recent report I called attention to a much needed improvement that should be made in the erection and equipment of a laboratory and hospital in the park whereby the welfare of the animals could be more thoroughly guarded, and where investigations of a zoological nature could be prosecuted for the increase of practical and scientific knowledge.

The number of animals of all kinds in the park collections on June 30, 1913, was 1,468, representing 154 species of mammals, 202 species of birds, and 31 species of reptiles, which are enumerated in detail on another page in the report of the superintendent. The important additions during the year included a pair of young African elephants, three dromedaries, a pair of cheetahs, several species of gazelles, and other animals from the Government Zoological Garden at Giza, Egypt; 7 ostriches from southern California; and 2 moose, a male and a female, from the Rocky Mountains National Park in Alberta.

Among the improvements completed in the park during the year was an outdoor parrot cage constructed through the generosity of Mr. John B. Henderson, jr., one of the regents of the Institution. An inclosure was also built for the ostriches recently received and one for the wood ducks and related species. Mention should also be made of the erection of a stone building, 24 by 40 feet, equipped for the cooking of food for the animals by boiling or baking, and also for cold storage. The building is abundantly lighted and thoroughly sanitary, and is a great improvement over the inadequate quarters heretofore used for food preparation.

An appropriation of \$20,000 was included in the sundry civil act for 1913 for the construction of a stone-faced or boulder bridge across Rock Creek to replace the log bridge erected in 1896 on the line of the roadway from Adams Mill Road. A contract for the construction of the new bridge was entered into on May 29, 1913, and work was begun soon after the close of the fiscal year. The bridge will be 80 feet in span and about 40 feet wide. It will be built of reinforced concrete faced with rough blocks of the blue gneiss found in this region, the stone for the concrete being obtained in the park.

In the sundry civil act for the fiscal year 1914 provision is made for the purchase of about 10½ acres of land to extend the west boundary of the park to Connecticut Avenue. The acquisition of this land has been urged for several years as a much-needed addition to the area of the Zoological Park.

THE ASTROPHYSICAL OBSERVATORY.

The Astrophysical Observatory continued during the past year the important investigations begun during the administration of the late Secretary Langley to determine the solar constant of radiation and the variability of the sun. In his account of the operations of the observatory on another page of this report Director Abbot discusses the results of these researches up to the present time and concludes that the observations at Bassour, Algeria, taken in connection with those made simultaneously at Mount Wilson, Cal., have established the variability of the sun. He concludes also that a variability connected with the sun-spot cycle has been shown.

Observations were also made to determine the effects of volcanic eruptions on climate. Soon after the eruption of Mount Katmai, Alaska, in June, 1912, the presence of dust in the upper air from this volcano was indicated both in California and in Algeria, and in August the direct radiation of the sun was found to be reduced about 20 per cent by the interposition of the dust cloud. Mr. Abbot and Mr. Fowle discuss the results of their observations and the general subject of "Volcanoes and Climate" in a paper in the Smithsonian Miscellaneous Collections. They conclude that a combination of the effects of sun spots and volcanic haze accounts for all the principal irregularities in the temperature of the earth for the last 30 years.

In connection with observations on nocturnal radiation it became necessary to determine the temperature and humidity prevailing above certain stations. This was accomplished with the cooperation of the United States Weather Bureau through the use of sounding balloons and captive balloons carrying to high altitudes self-recording apparatus for measuring the temperature, pressure, and humidity of the air.

There was completed during the year volume III of the Annals of the Astrophysical Observatory, recording the work accomplished from 1907 to 1913.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

There is administered by the Smithsonian Institution through a small annual appropriation by Congress, the United States Bureau of the International Catalogue of Scientific Literature. This is one of the 33 regional bureaus whose function it is to collect, index, and classify all scientific publications of the year in each country and to send the classified references to the central bureau in London, where, since 1901, they have been collated and published in a series

of 17 annual volumes which form an index to current scientific literature.

The catalogue is not of a commercial character, but by economical methods of administration, and partly through the revenue obtained from subscriptions to the series of volumes, it is hoped that the enterprise will be self-supporting with the exception of the general expenses of the regional bureaus in gathering the data.

The United States bureau sent to the central bureau during the past year 27,995 cards, making a total of 290,330 cards forwarded from this country since the work was begun in 1901. The total number of classified citations received at the central bureau in London from 1901 to 1913 was about 2,500,000.

Although the congressional appropriation for the bureau is intended primarily for maintaining a purely scientific international enterprise, yet, without added expense, the bureau is of value to the public as a source of general information on many scientific subjects. The Smithsonian Institution is in constant receipt of requests for information on a very great variety of topics, and since it is the purpose of the International Catalogue to collect and classify the published results of scientific investigation many of these inquiries are referred for reply to this bureau.

NECROLOGY.

JAMES SCHOOLCRAFT SHERMAN.

At the annual meeting of the Regents on December 12, 1912, the following resolutions were adopted to the memory of Vice President Sherman:

Whereas the Board of Regents of the Smithsonian Institution have received the sad intelligence of the death on October 30, 1912, of James Schoolcraft Sherman, Vice President of the United States and Chancellor of the Institution, therefore, be it

Resolved, That in the passing away of this distinguished official the country has lost a man whose unsullied public career and blameless private life marked him as one of the best exemplars of the highest type of American patriotism and citizenship; while this Institution has been deprived of the association of a Regent and presiding officer whose loyalty to its purposes and zeal in its interests have been an inspiration to his colleagues.

Resolved, That we tender to the family of Mr. Sherman our respectful and sincere sympathy in their great bereavement.

Resolved, That an engrossed copy of these resolutions be transmitted to the family of the late chancellor.

James Schoolcraft Sherman, LL.D., born in Utica, N. Y., October 24, 1855, became a Regent of the Smithsonian Institution upon taking the oath of office as Vice President of the United States on March 4, 1909, and was elected Chancellor of the Institution on December 8, 1910, as successor to Chancellor Melville Weston Fuller, Chief Justice

of the United States, who died July 4, 1910. Mr. Sherman received the degree of LL.B. from Hamilton College in 1878 and LL.D. in 1903. He was admitted to the bar in 1880 and practiced his profession at Utica; was mayor of Utica, 1884-85; Member of Congress, 1887 to 1891 and 1893 to 1909, and was elected Vice President November 3, 1908. He had been trustee of Hamilton College since 1905, and held important positions of trust in his native city.

JOHN BROOKS HENDERSON.

At a special meeting of the Regents on May 1, 1913, a resolution was adopted in memory of the Hon. John B. Henderson, who served as a Regent from January 26, 1892, to March 1, 1911, when he felt obliged to retire from active duties on account of failing health. His sound judgment and wise counsel as chairman of the executive committee and as member of the permanent committee had been of great assistance to the board throughout his long term of service. Mr. Henderson was born near Danville, Va., on November 26, 1826, and died at Takoma Park, District of Columbia, on April 12, 1913. He was United States Senator from Missouri from 1862 to 1869, and filled many other honorable positions during earlier and later periods of his life. He had been a resident of Washington City since 1890.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1913:

IMPORTANT MATTERS OF THE YEAR.

Although many important matters developed, as usual, in connection with the operations of the Museum during last year, those of chief general interest related to the exhibition collections in the new building and to the progress of work in the department of arts and industries. As explained in the last report, only the first and second stories of the new building, with an aggregate floor area of 185,294 square feet, are being utilized at present for the permanent installations, which, with a single exception, relate wholly to natural history. The last of this space was opened to the public during April, 1913, but to a certain extent the exhibits still remain incomplete and the arrangements provisional. The plan of three wings particularly adapts this building to the three departments of anthropology, biology, and geology, representing the organization of the natural history collections, each of which has been allotted an entire wing for its exhibition series, the overflow from each being continued into the adjacent ranges.

Of the several branches which are administered in the department of anthropology, three have been established in the new building as constituting what is now commonly recognized in museum classification as one of the great divisions of natural history. They are physical anthropology, ethnology, and archeology. Physical anthropology is not yet represented in the public halls, though an important installation of a technical character has been provided in the laboratory. Each of the other subjects, however, has been extensively illustrated on a popular though none the less instructive basis, to which purpose a total floor area of 65,941 square feet has been assigned. Ethnology occupies the entire available space allotted to the department in the first story, namely, the northern section of both ranges, and all parts of the north wing surrounding the picture gallery, which is temporary in its location here. The total area covered is

35,474 square feet. The arrangement is geographical, and the exhibits find their key in family groups placed centrally in the halls. The archeological collections are displayed in the second story, the Old World series, both historic and prehistoric, occupying the eastern side and northern end of the wing to the extent of about 7,927 square feet, and the New World series the eastern side of the wing and the entire east range, with a floor area of 22,540 square feet. The exhibition of North American archeology is especially full and important.

The classification of the biological exhibits, at present restricted to zoology, comprises five principal and several minor subdivisions, of which the most extensive consists of a comprehensive representation of all the main groups of animals, each arranged faunally. Next follow a systematic series, a series illustrating comparative anatomy and osteology which is practically subsidiary to it, a series of domestic animals, and a faunal series for the District of Columbia. These are supplemented by a number of special exhibits illustrating interesting phases in zoology and noteworthy features of the collection. The entire amount of space assigned to the department is 64,398 square feet, of which the faunally arranged exhibit utilizes 41,058 square feet. The mammals in this collection occupy the first floor of the west wing, with the exception of a small area in which the series of birds begins, the latter extending thence through the western section of the west range; while the reptiles, batrachians, fishes, and invertebrates are installed in the second story of the wing. On the northern side of the wing is the collection of comparative anatomy and osteology, followed successively in the west range by the systematic series, the domestic animals, and the faunal exhibit of the District of Columbia, the special exhibits being provided for in alcoves on the court side of the range.

The geological exhibits are classified under four subjects, namely, systematic or physical and chemical geology, applied geology, mineralogy and paleontology. Besides the east wing, of which they have entire possession, they occupy only the eastern section of the adjoining range in the first story, the combined area amounting to 47,691 square feet. Systematic geology is displayed in the range, while applied geology, including the most complete series of building and ornamental stones in the country, and mineralogy, with the beginnings of an excellent representation of gems and precious stones, are accommodated in the second story of the wing. In the lower story, which is wholly devoted to paleontology, the fossil vertebrates, with many skillfully prepared remains of extinct animals and several large and striking skeletons, occupy the large sky-lighted hall and eastern end of the wing, the fossil invertebrates the southern side of the wing, and the fossil plants the northern side.

In the matter of reorganizing the several industrial collections which were long ago displaced through the overcrowding of the older buildings in which they are now being rearranged, excellent progress was made despite the limited means available. The division of mineral technology, which had been nominally recognized for several years and for which a large amount of valuable material has been held in storage, was actively established, but not until late in the year. In the division of textiles, in which the work was started over a year earlier, the results accomplished have been sufficient to very materially attract public notice. The old collection, including also certain animal and vegetable products, was first unpacked, and, although much of it had so greatly deteriorated as to be rendered useless, there remained an excellent nucleus to build upon, the material being chiefly serviceable for its bearing on the history and development of the subjects represented. It was extensively drawn upon in preparing a preliminary exhibition series, which was practically completed before the close of the fiscal year 1912. During last year there was marked activity in the acquisition of new material, in the extension of the exhibition collections, and in the general work of the division. Many of the leading manufacturers were advised with, and their cordial approval of the plans and the substantial support they have already given the Museum insures beyond question the building up of a thoroughly practical representation of the textile and allied industries. The accessions of the year covered a wide range of materials and manufacture, and included raw materials, intermediate stages, and finished products, as well as illustrations of various processes. They were almost wholly from American sources, among the exceptions being an instructive exhibit of the woollen industry of Bradford, England, and another of native Filipino handicraft in the making of mats, baskets, hats, fabrics, and other useful articles. In lines other than textiles the additions related mainly to the utilization of rubber, and included many testimonials to Charles Goodyear, whose name is indissolubly connected with the origin and early advancement of this important industry. The installation of textiles kept pace with the receipt of materials, and by the close of the year a very notable and attractive exhibition had been assembled, mainly in the south hall of the older building.

COLLECTIONS.

The total number of specimens acquired during the year was approximately 302,132, of which 26,999 pertained to the several subjects covered by the department of anthropology; 113,509 were zoological, 140,015 botanical, 5,569 geological, and 14,716 paleontological; while 12 were paintings for the National Gallery of Art, and 1,312 were textiles and useful plant products for the department of arts and industries. Several important loans for exhibition, consist-

ing mainly of historical and ethnological objects and paintings, were also received.

The additions in ethnology came mainly from the Philippine Islands and other parts of the Far East, from Paraguay and Dutch Guiana, and from the middle and western United States. Maine, Pennsylvania, Maryland, Virginia, and Kentucky were chiefly represented in the contributions to prehistoric archeology, while Egyptian and Greco-Roman antiquities and small lots of materials from various European localities composed the principal acquisitions in historic archeology. The division of physical anthropology received valuable accessions, mainly of skeletal remains, from many sources, the most noteworthy consisting of a large collection made by the curator in Mongolia. In the division of mechanical technology the most extensive additions were to the section of firearms and other weapons, and included several early and rare pieces; while in the division of graphic arts they were illustrative of recent methods of pictorial reproduction. Most prominently to be noted in connection with the division of history was the gift by Mr. Eben Appleton of "The Star Spangled Banner," which had been exhibited as a loan since 1907. This witness of the gallant defense of Fort McHenry during its unsuccessful bombardment by the British fleet on September 13 and 14, 1814, immortalized by the stirring verses of Francis Scott Key, has been accorded a conspicuous place of honor in the principal hall of history. Among other notable acquisitions were memorials of the Washburn family and of Generals U. S. Grant and Frederick D. Grant; a bronze cannon, with its wooden carriage, brought to America by General Lafayette and used in the Revolution; over 21,000 postage stamps and postal cards, added to the large collection from the Post Office Department; the *Titanic* memorial gold medal issued by the Carnegie Hero Fund Commission; and, as a loan, the collection of historical china assembled by the late Rear Admiral F. W. Dickins, United States Navy, consisting of about 500 pieces, and including a large number of fine examples of presidential china from the administration of Washington to that of Benjamin Harrison.

For some of its most important acquisitions the department of biology was indebted to several expeditions to distant regions, conducted at private expense. The most extensive of these, undertaken by Mr. Childs Frick, who was accompanied by Dr. E. A. Mearns, United States Army (retired), and others, visited Abyssinia and British East Africa, and was absent from January to September, 1912. The birds obtained, numbering over 5,000, have been deposited in the Museum. On a hunting trip to the region of the Altai Mountains, in Asia, Dr. Theodore Lyman, of Harvard University, with the assistance of Mr. N. Hollister, of the Museum staff, secured about 650 specimens of mammals and birds, which have been shared be-

tween the Museum of Comparative Zoology and the National Museum. Dr. W. L. Abbott, who continued his collecting work in Kashmir, also maintained a naturalist in Borneo to extend the field work which he had so effectively carried on for several years. From the former region a large number of small mammals were received during the year, and from the latter many specimens of mammals, birds, and reptiles. Mr. Arthur de C. Sowerby transmitted mammals and reptiles from China; Mr. D. D. Streeter, jr., collected mammals and reptiles in Borneo; Mr. George Mixter visited Lake Baikal, Siberia, and its vicinity, securing specimens of the native bear, of the seal peculiar to the lake, and of a number of small mammals; and Mr. Copley Amory, jr., joining a Coast Survey party in Alaska, obtained many mammals, including several caribou and an interesting series of bones of fossil species. Mr. A. C. Bent in the course of investigations in Newfoundland and Labrador made collections of birds, and Dr. Paul Bartsch and Dr. T. Wayland Vaughan, as guests on the Carnegie steamer *Anton Dohrn*, collected marine invertebrates among the Florida Keys, as did also Mr. John B. Henderson, jr., by means of dredgings from his yacht *Eolis*. Mr. Paul G. Russell, of the division of plants, who accompanied an expedition of the Carnegie Institution to the West Indies, secured for the Museum several thousand botanical specimens.

The division of mammals was fortunate in obtaining an exceptionally fine mounted specimen and skeleton of the rare okapi from the Kongo region of Africa. The principal accessions of fishes and marine invertebrates were from explorations by the Bureau of Fisheries in various parts of the Pacific Ocean, consisting mainly of collections that had been studied and described. Among fishes were the types of 110 new species, while the marine invertebrates included extensive series of crustaceans and echinoderms, besides ascidians and plankton material from the Atlantic coast. Mollusks were received from various localities in North America and from the Bahama Islands, Venezuela, South Australia, and the Dutch East Indies. Of insects over 37,000 specimens were acquired, including 15,000 forest insects from West Virginia, valuable material from India and Great Britain, and about 10,000 well-prepared beetles from the District of Columbia, which are intended to be used in connection with the exhibition series of the local fauna. The division of plants was enriched to the extent of 140,000 specimens. The principal addition consisted of some 80,000 specimens of grasses, transferred by the Department of Agriculture, which, with 12,800 specimens purchased during the year and the material previously in the herbarium, places the Museum in possession of the largest and most comprehensive collection of grasses in this country. Other important accessions were the Wootton collection of 10,000 plants mostly

from New Mexico, about 10,000 West Indian plants, a valuable series from British Guiana, and the C. Henry Kain collection of diatoms, one of the finest in the world, and supposed to be the largest in the United States.

The more important additions to the department of geology were illustrative of published results of investigations by the Geological Survey, comprising rocks, ores, and minerals from some of the Western States, and fossils from the middle Devonian of New York, the early Devonian and Silurian of Maine, and the Ordovician of Tennessee. Other noteworthy collections of fossil invertebrates received were from the Silurian and Devonian of the Detroit River region, the Silurian of Ohio, and the Tertiary of the Panama Canal Zone, while of vertebrate remains the accessions included a large series of mammals from the Fort Union beds of Montana, many genera and species from recently uncovered Pleistocene cave deposits in Maryland, and a small but interesting series of bones from the Yukon territory containing the first evidence of the former extension of the range of the camel on this continent beyond the Arctic Circle. The Geological Survey transmitted a large collection of Cretaceous and Tertiary plants from Colorado and New Mexico, containing 271 type and illustrated specimens. Large collections of Cambrian fossils were made by Secretary Walcott in British Columbia and Alberta in connection with his geological work in the Canadian Rockies.

NATIONAL GALLERY OF ART.

The permanent additions to the Gallery consisted of 12 paintings, 10 of which were gifts and 2 bequests. Of the former, 7 were received from Mr. William T. Evans as contributions to his notable collection of the work of contemporary American painters and are as follows: "The Meadow Brook," by Charles Paul Gruppe; "The Mourning Brave," by Edwin W. Deming; "The Fur Muff," by Robert David Gauley; "Water Lilies," by Walter Shirlaw; "Castle Creek Canyon, South Dakota," by Frank De Haven; and "Christ before Pilate" and "Suffer the Little Children to Come unto Me," by Otto W. Beck, the last two being pastels. The other gifts were "Twilight after Rain," by Norwood H. MacGilvary, presented by Mr. Frederic F. Sherman in memory of Eloise Lee Sherman; "The Wreck," by Harrington Fitzgerald, donated by the artist; and "The Lace Maker," after Terburg, contributed by Miss Julia H. Chadwick. The bequests consisted of the "Tomb of 'Mahomet the Gentleman' at Broussa," by Hamdy Bey, from Mrs. Elizabeth C. Hobson; and a portrait from the widow of the late Col. Albert B. Brackett, United States Army, by G. P. A. Healy. The additions to the loan collection comprised 18 paintings and 2 marble sculptures received from 12 friends of the Gallery.

ART TEXTILES.

The lace exhibit now embraces a fairly connected series both in respect to the varieties of laces and the development of the industry, and it also contains some important examples which from their quality and rarity form striking museum pieces. Though smaller and less conspicuous in the matter of display material than some others, it ranks high among the museum collections of the country. The work during the year was mainly in the direction of securing a more systematic arrangement of the collection and of more fully labeling both specimens and cases. The collection at present consists chiefly of loans, which have increased in number from year to year, with the expectation of soon making the collection more permanent in character.

MISCELLANEOUS.

Duplicate specimens to the number of about 7,300 were distributed to schools and colleges for teaching purposes, the subjects represented being mainly fishes, insects, marine invertebrates, rocks, ores, minerals, and fossils. Some 1,500 pounds of material suitable for blow-pipe and assay work by students was also similarly disposed of. Over 21,000 duplicates were used in making exchanges, about 85 per cent of this number being plants. Two hundred and six lots of specimens were sent to specialists for working up both on behalf of the Museum and in the interest of the advancement of researches by other institutions. They comprised over 12,700 individual specimens, besides several hundred packages of unassorted material, principally of animals, plants, and fossils.

The aggregate number of visitors to the new building on week days during the year was 261,636, a daily average of 836, and on Sundays 58,170, a daily average of 1,118. The attendance at the older Museum building was 173,858, and at the Smithsonian building 142,420, these figures representing a daily average of 555 for the former and of 455 for the latter. During inaugural week in March, 1913, the daily average for the new building was increased to 5,325 persons, the largest attendance for any single day having been 13,236 on March 5.

The publications consisted of Bulletins 79 and 81 and volumes 42 and 43 of the Proceedings, besides 105 papers issued in separate form, of which 96 belonged to the series of Proceedings and 9 to the Contributions from the National Herbarium. Thirty-five papers on Museum subjects, mainly descriptive of new additions to the collections, were also published in the Smithsonian Miscellaneous Collections. The number of copies of Museum publications distributed, including earlier issues as well as those of the year, was about 71,600.

The furnishing of the library quarters in the new building was completed early in the autumn of 1912, and the transfer of the books and equipment intended to be kept there was soon afterwards accomplished. While designed primarily to accommodate the natural history and anthropological publications, which comprise the major part of the collection, this has also been constituted the main or central library, where most of the general works of reference will be placed and where all publications will be received and catalogued. The library in the older building will hereafter be mainly restricted to the subjects of history and the arts and industries. The accessions of the year consisted of 1,690 books, 2,213 pamphlets, and 159 parts of volumes, which increased the total contents of the library to 43,692 volumes and 72,042 unbound papers of all kinds.

The facilities afforded by the new building for meetings and other functions were frequently availed of. The auditorium and committee rooms were used for the regular meetings of the Anthropological Society of Washington, the Washington Society of the Fine Arts, and the Spanish-American Atheneum, and for a course of lectures under the Naval War College Extension. The annual meeting and semicentennial anniversary of the National Academy of Sciences were held in April. Of congresses and other assemblages which were accommodated wholly or in part in the building were the Fifteenth International Congress on Hygiene and Demography; the Ninth Triennial Congress of American Physicians and Surgeons; a joint meeting of the American Philological Association, the Archaeological Institute of America, and the Society of Biblical Literature and Exegesis; a meeting of the American Farm-Management Association; the Twentieth Annual Convention of the International Kindergarten Union; and a meeting of the General Federation of Women's Clubs. The Department of Agriculture had the use of the auditorium for annual conferences on farm management and meat inspection. Besides similar functions in connection with two of the above meetings, receptions were given by the Regents and Secretary to the members in attendance at the Eighth International Congress of Applied Chemistry and the Sixth International Congress for Testing Materials, and to the Daughters of the American Revolution. On the evening of March 6 Mr. James Wilson, late Secretary of Agriculture, was tendered a reception by the employees of the Department of Agriculture.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary in Charge, U. S. National Museum.

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

NOVEMBER 12, 1913.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR: I have the honor to submit the following report of the operations of the Bureau of American Ethnology during the fiscal year ended June 30, 1913, which have been conducted by authority of the act of Congress approved August 24, 1912, making appropriations for sundry civil expenses of the Government, and in accordance with a plan of operations approved by the Secretary of the Smithsonian Institution. The act referred to contains the following provision:

American ethnology: For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archaeological remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, \$42,000.

SYSTEMATIC RESEARCHES.

The systematic researches were conducted by the regular staff of the bureau, consisting of seven ethnologists, and by other specialists not directly connected with the bureau. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, was occupied almost entirely during the year with administrative affairs pertaining to the bureau's activities. He was able to devote some time to the preparation of the Bibliography of the Pueblo Indians, the writings relating to the subject covering so extended a period (from 1539 to date) and being so numerous that much remains to be done. He devoted attention also, as opportunity offered, to the revision of certain sections of the Handbook of American Indians, but as it is the desire to revise this work completely, with the aid of the entire staff of the bureau as well as of other specialists, little more than a beginning of the revision has been made. Mr. Hodge continued to represent the Smithsonian Institution at the meetings of the United States Board on Geographic Names, and the Bureau of American Ethnology on the Smithsonian advisory committee on printing and publication.

Dr. J. Walter Fewkes, ethnologist, spent the summer months and part of the autumn of 1912 in correcting the proofs of his monograph on Casa Grande and of his report on the Antiquities of the Upper Verde River and Walnut Creek Valleys, Arizona, both of which

appear in the Twenty-eighth Annual Report of the bureau, and in completing the draft of a memoir devoted to the Symbolic Designs on Hopi Pottery, which it is designed to publish with numerous illustrations. The remainder of the autumn was occupied by Dr. Fewkes in gathering material for an eventual memoir on the Culture History of the Aborigines of the Lesser Antilles, these data being derived chiefly from a study of the early literature of the subject and of the rich West Indian collections from the island of St. Vincent in the Heye Museum of New York City. Preparatory to the publication of the final results, Dr. Fewkes, with the generous permission of George G. Heye, Esq., selected with entire freedom the necessary objects for illustration, and before the close of the fiscal year about 200 drawings of the archeological objects in this important collection had been finished.

In October, 1912, Dr. Fewkes sailed for the West Indies under the joint auspices of the bureau and the Heye Museum, the special object in view being the gathering of new archeological data through the excavation of village sites and refuse-heaps and the examination of local collections in the islands. Dr. Fewkes visited Trinidad, Barbados, St. Vincent, Balliceaux, Grenada, Dominica, St. Kitts, Santa Cruz, and other islands, excavating shell-heaps in Trinidad and Balliceaux, and making archeological studies in other isles. The results of the investigations in Trinidad proved to be especially important, owing to the light which they shed on the material culture of the former aborigines of the coast adjacent to South America.

Extensive excavations were made in a large shell-heap, known as Tchip-Tchip Hill, on the shore of Erin Bay in the Cedros district. This midden is historic, for it was in Erin Bay that Columbus anchored on his third voyage, sending men ashore to fill their casks at the spring or stream near this Indian mound. Tchip-Tchip Hill is now covered with buildings to so great an extent that it was possible to conduct excavations only at its periphery; nevertheless the diggings yielded a rich and unique collection that well illustrates the culture of the natives of this part of Trinidad. The collection consists of several fine unbroken pottery vessels with painted decoration, and more than a hundred well-made effigy heads of clay, in addition to effigy jars and many broken decorated bowls. There were also obtained from the Erin Bay midden several stone hatchets characteristic of Trinidad and the adjacent coast of South America, a few shell and bone gorgets, and other artifacts illustrating the activities of the former inhabitants. It is an interesting fact that as a whole the objects here found resemble those that have been taken from shell-heaps on the Venezuela coast and from the Pomeroon district of British Guiana more closely than they resemble related specimens from the other islands of the Lesser Antilles. Several other middens

were examined in Trinidad, the most representative of which is situated near San Jose, the old Spanish capital. Promising shell-heaps were discovered also at Mayaro Bay on the eastern coast.

One of the most important results of the West Indian field work by Dr. Fewkes was a determination of the geographical distribution of certain types of artifacts and a comparison of the prehistoric culture areas in the so-called Carib Islands. Evidence of the existence of a sedentary culture on these islands preceding that of the Carib was obtained, showing it to have distantly resembled that of Porto Rico; this culture, however, was not uniform. Dr. Fewkes also found that there were a number of subcultures in these islands. In prehistoric time Trinidad and Tobago, it was determined, were somewhat similar culturally, just as they are similar geologically and biologically, to northern South America. In Dr. Fewkes's opinion perhaps nowhere is the effect of environment on human culture better illustrated than in the chain of islands extending from Grenada to Guadeloupe, which were inhabited, when discovered, by Carib, some of whose descendants are still to be found in Dominica and St. Vincent. The earlier or pre-Carib people were culturally distinct from those of Trinidad in the south, St. Kitts in the north, and Barbados in the east. The stone implements of the area are characteristic and the prehistoric pottery can readily be distinguished from that of the islands beyond the limits named.

A large number of shell-heaps on St. Vincent were visited and studies made of localities in that island in which caches of stone implements have been found. Six groups of petroglyphs were examined, even some of the best known of which have never been described. Special effort was made to obtain information respecting the origin of certain problematical objects of tufaceous stone in the Heye Museum, said to have been collected from beneath the lava beds on the flank of the Soufrière.

Dr. Fewkes visited the locality on the island of Balliceaux where the Carib of St. Vincent were settled after the Carib wars and before they were deported to Roatan on the coast of Honduras. Extensive excavations were made at the site of their former settlement at Banana Bay, where there is now a midden overgrown with brush. Here much pottery, as well as several human skeletons and some shells and animal bones, were found.

The mixed-blood survivors of the St. Vincent Carib who once lived at Morne Rond, near the Soufrière, but who are now settled at Campden Park near Kingstown, were visited. These still retain some of their old customs, as making cassava from the poisonous roots of the manihot, and preserve a few words of their native tongue. A brief vocabulary was obtained, but Carib is no longer habitually spoken in St. Vincent.

The fertile island of St. Kitts and the neighboring Nevis were found to be particularly instructive archeologically. Both have several extensive middens and well-preserved pictographs, the former having yielded many artifacts that illustrate the material culture of its pre-Carib inhabitants. Through the courtesy of Mr. Connell his large collection, which adequately illustrates the culture of St. Kitts and Nevis, was placed at the disposal of Dr. Fewkes for the purpose of study, and he was permitted to make drawings of the more typical objects, one of the most instructive of which is a sculptured torso from Nevis.

In Barbados Dr. Fewkes examined the midden at Indian River, on the west coast, from which site the important Taylor archeological collection was gathered. Several other middens were visited on the lee coast from Bridgetown to the northern end of the island, where a marly hill strewn with potsherds was observed. He also examined the so-called "Indian excavations" at Freshwater Bay and others at Indian River, and visited several cave shelters on the island. The most noteworthy of these caves are situated at Mount Gilboa and in the Scotland district, St. Lucy Parish. To one of these, known as the "Indian Castle," described in 1750 by the Rev. Griffith Hughes, who claims to have found therein an idol and other undoubted Indian objects, Dr. Fewkes devoted much attention. The gulches so characteristic of Barbados were favorite resorts of the aborigines, and, judging by the artifacts, furnished cave shelters for them. Although uninhabited at the time of its discovery, there is evidence of a considerable prehistoric aboriginal population in Barbados, whose culture was influenced largely by the character of the material from which their artifacts were made, most of them being fashioned from shell instead of stone, a characteristic seemingly constituting this island a special culture area.

A collection of stone implements, including celts, axes, and other objects, was gathered at Santa Cruz. Several local collections of archeological objects were examined, and the large midden at the mouth of Salt River was visited. The prehistoric objects obtained on this island and from St. Thomas resemble those from Porto Rico.

Although the Carib inhabitants of the Lesser Antilles are no longer of pure blood, and their language is known to only a few persons in Dominica and St. Vincent, and to these but imperfectly, it was found that the negroes, who form more than nine-tenths of the insular population, retain in modified form some traces of the material culture of the Indians. Cassava is the chief food of many of the people, and the method of its preparation has been little changed since aboriginal times. Cocoa is ground on a stone and made into cylindrical rolls in much the same manner as it was prepared by the Indians in early times. The basketry made in Do-

minica was found to be the same in style and materials as is described by the early missionaries to the Carib; while the negroes of Nevis manufacture pottery of the same form and ornament and burn it in much the same way as that found in the middens of St. Kitts. In working their spells, the obia men commonly sprinkle stone objects with the blood of a goat, and the common people regard petroglyphs as "jumbies," or bugaboos. A great number of folk tales of a mixed aboriginal and negro type are still recounted in the cabins of the lowly, where Carib names for animals, plants, and places are household words.

On his return to Washington Dr. Fewkes undertook the preparation of a report on his archeological researches in the West Indies, and considerable progress therein had been made by the close of the fiscal year.

Mr. James Mooney, ethnologist, was occupied during the greater part of the year with the investigation of Indian population, which has engaged his attention for a considerable time. This research covers the whole period from the first occupancy of the country by white people to the present time, and includes the entire territory from the Rio Grande to the Arctic. To make possible systematic treatment the area covered has been mapped into about 25 sections, each of which constitutes approximately a single geographical and historical unit for separate treatment, although numerous migrations and removals, and the frequent formation of new combinations, necessitate a constant overlapping of the work of the sections. Several of the eastern areas have been completed and more or less progress has been made with each of the others. More recently Mr. Mooney has concentrated attention on Alaska and western Canada, for the Arctic parts of which Mr. Vilhjálmur Stefánsson and Dr. Waldemar Jochelson have generously furnished new and valuable data. In this memoir the plan is to include chapters on notable epidemics, vital statistics, and race admixture, and the work is intended to appear as a monograph on the subject.

On June 18, 1913, Mr. Mooney proceeded to the Eastern Cherokee Indians in North Carolina to continue his investigations of the medical and religious ritual of that tribe, commenced a number of years ago, as it was deemed wise to finish this part of his Cherokee studies as soon as practicable by reason of the changes that are so rapidly taking place among this people. Mr. Mooney was still in the field at the close of the fiscal year.

Dr. John R. Swanton, ethnologist, continued, both in the field and at the office, his studies of the Indians formerly occupying the territory of the southern States. He spent the month of November, 1912, with the Alabama and Koasati Indians in Polk County, Tex., where he recorded 250 pages of texts in the dialects spoken by these

two tribes, corrected several texts obtained on earlier expeditions, and added materially to his general ethnological information regarding them. In December Dr. Swanton proceeded to Oklahoma, where he obtained about 50 pages of text in Hitchiti, a language now confined to a very few persons among the Creek Indians, and collected a few notes regarding the Choctaw.

Before his departure from Washington and after his return Dr. Swanton spent the greater part of the time in collecting information concerning the Southern tribes from early Spanish, French, and English authorities. Considerable attention was also devoted to reading the proofs of the Rev. Cyrus Byington's Choctaw Dictionary, now in process of printing, in which labor he was efficiently aided by Mr. H. S. Halbert, of the Alabama State department of archives and history. Dr. Swanton also commenced a general grammatical study of the languages of the Muskogean stock, particularly Alabama, Hitchiti, and Choctaw, and in order to further this work he was subsequently engaged in making a preliminary stem catalogue of Creek from the material recorded by the late Dr. Gatschet, similar to the catalogue already prepared for Hitchiti, Alabama, and Natchez. He began also the preparation of a card catalogue of words in Timucua, the ancient extinct language of Florida, taken from the grammar and catechisms of Father Pareja. In May, Dr. Swanton visited New York in order to examine rare Timucua works in the Buckingham Smith collection of the New York Historical Society. Through the courtesy of this society and of the New York Public Library arrangements have been made for furnishing photostat copies of these rare and important books, and the reproductions were in preparation at the close of the fiscal year.

In connection with the researches of Dr. Swanton, it is gratifying to report that he was awarded last spring the second Loubat prize in recognition of his two publications—"Tlingit Myths and Texts" and "Indian Tribes of the Lower Mississippi Valley and Adjacent Coast of the Gulf of Mexico"—both issued by the bureau.

Mrs. M. C. Stevenson, ethnologist, devoted her time to the conclusion of her researches among the Tewa Indians of New Mexico and to the preparation of a paper on that interesting and conservative people. A preliminary table of contents of the proposed memoir indicates that her studies of the customs and beliefs of the Tewa will be as comprehensive as the published results of her investigations of the Sia and the Zuñi tribe of the same State. As at present outlined, the work, which will soon be completed, will contain six sections, dealing with the following subjects, respectively: Philosophy, anthropic worship and ritual, zoic worship, social customs, material culture, and history.

Dr. Truman Michelson, ethnologist, continued his studies among the Algonquian tribes. In the middle of July, 1912, he proceeded to the Fox Indians, at Tama, Iowa, from whom a large additional body of mythological material was obtained; this, in connection with the myths and legends in the form of texts gathered during the previous season, approximates 7,000 pages. When the translation of this material shall have been finished it will form one of the most exhaustive collections of mythology of any Indian tribe. It is noteworthy that these myths and tales differ essentially in style from those gathered by the late Dr. William Jones (scarcely any of whose material has been duplicated by Dr. Michelson), a fact that emphasizes the necessity of recording such material in the aboriginal tongue. It may be added that the myths and tales collected are also important in the light they shed on the dissemination of myths. Study of the social and ceremonial organization of the Fox Indians was likewise continued, and especially full notes were obtained on their Religion dance. Many of the songs of one of the drums were recorded on a dictaphone and several photographs of the native ball game were secured.

Dr. Michelson next proceeded to Haskell Institute, the nonreservation Indian school at Lawrence, Kans., for the purpose of obtaining notes on Atsina (Gros Ventre) and several other Algonquian languages, the results of which show definitely that Atsina shares with Arapaho all the deviations from normal Algonquian, and that Potawatomi is further removed from Ojibwa, Ottawa, and Algonkin than any one of these is from the others.

Dr. Michelson next visited the Munsee, in Kansas, but found that, unfortunately, little is now available in the way of information except as to their language, which is still spoken by about half a dozen individuals, though none employ it habitually.

The Delawares of Oklahoma were next visited, Dr. Michelson finding that their aboriginal customs are still retained to a large extent. Extended observations were made on several dances, and, to a lesser extent, on the social organization. From a study of the Delaware language, together with the Munsee dialect of Kansas, it was ascertained, as had previously been surmised, that the Delaware language of the early Moravian missionary Zeisberger represents no single dialect but a medley of several dialects.

On his way to Washington Dr. Michelson stopped again at Tama to obtain additional notes on the Fox Indians; at the same time he succeeded in arranging for the acquirement of certain sacred packs for the National Museum. He also visited Chicago and New York for the purpose of making comparative observations on the material culture of the Fox tribe, based on collections in the museums of those cities.

On his arrival in Washington, at the close of December, Dr. Michelson undertook the translation and study of some of the Fox myths; the results indicate that very great firmness in the word unit in Algonquian is more apparent than real, and that the classification of stems must be revised. Dr. Michelson also brought to conclusion his translation of the Kickapoo myths and tales collected by the late Dr. Jones, to which were added notes on Kickapoo grammar and comparative notes on the myths and tales, the whole making somewhat more than 300 pages.

Through correspondence Dr. Michelson succeeded in arranging for the acquirement of other sacred packs of the Fox Indians, which have been deposited in the National Museum. He also aided in furnishing information in answer to inquiries by various correspondents, and from time to time supplied data for incorporation in a new edition of the Handbook of American Indians.

From the investigations of the bureau it seemed that the Siouan and Muskogean languages resembled each other morphologically. In view of these circumstances, it was deemed desirable that the Catawba, one of the Siouan tongues, should be restudied, and accordingly, toward the close of May, 1913, Dr. Michelson proceeded to South Carolina, where the remnant of the Catawba tribe still reside. Unfortunately, it was found that the language is all but extinct, not even half a dozen persons being able to recall phrases, although isolated words can still be had in goodly number. Owing to this paucity of text material it is hardly likely that the grammar of Catawba will ever be completely elucidated, and as no comparative study with other Siouan dialects has yet been made, it is not practicable at present to say with which Siouan group the language is most closely associated. A considerable number of native songs are still remembered by the surviving Catawba, nearly all of which Dr. Michelson succeeded in recording by dictaphone.

Mr. J. N. B. Hewitt, ethnologist, was occupied during the year in translating unedited Seneca texts of myths which were collected by himself in 1896 and at other times on the Cattaraugus Reservation in western New York and on the Grand River Reservation in Ontario, Canada. These myths, legends, and tales number 13 in all. In addition, Mr. Hewitt undertook the editing of two Seneca texts—"The Legend of S'hagowé"not'hă', or The Spirit of the Tides," and "The Tale of Doă'danégě" and Hotkwisdadegě"ă"—recorded by himself in the form of field notes in 1896 and aggregating 95 typewritten pages. At the close of the fiscal year about one-third of this work was completed. To these texts interlinear translations are to be added for the purpose of aiding in the grammatic study of the Seneca tongue.

Mr. Hewitt also devoted much time to the collection and preparation of data for answers to correspondents of the bureau, especially with reference to the Iroquoian and Algonquian tribes.

Mr. Francis La Flesche, ethnologist, continued his investigations of the ethnology of the Osage Indians, giving particular attention to their rituals and accompanying songs. He was enabled to record on the dictaphone the songs and fragments of the rituals belonging to the Waxobe degree of the No'ho'zhi'ga rites, of which, as noted in the last annual report, he has been making a special study. These rituals have been transcribed and, with the 84 songs that have been transcribed in musical notation by Miss Alice C. Fletcher, comprise 66 typewritten pages.

Mr. La Flesche has also been able to record the No'zhi'zho', or Fasting degree, of the Puma and Black Bear gentes. These two organizations are closely related; they not only use in common the songs and rituals of the No'ho'zhi'ga rites, but they even go to the extent of exchanging gentile personal names as full recognition of their relationship. The No'zhi'zho' degree employs 12 rituals and numerous songs, of which latter 81 have been recorded. These songs are divided into two great groups, the first of which is known as "The Seven Songs," having 16 sets, and the second, "The Six Songs," having 17 sets. The Osage texts of these rituals and songs cover 207 pages, about three-fourths of which have been finally typewritten. The 81 songs have been transcribed in musical notation by Miss Fletcher, while the translation of the rituals and the words of the songs is in progress.

In the autumn of 1912 Mr. La Flesche was fortunate in securing in full the Ni'k'i degree of these intricate Osage rites. Hitherto he had been able to obtain only the beginning of this degree, but his informant was finally induced to recite it in its entirety, comprising 1,542 lines. The real title of this degree is Ni'k'i No'k'o', "The Hearing of the Words of the People." In it the genesis of the tribe is given in a story made up of myth, legend, and symbolism, the whole being clearly devised to keep the people ever mindful of the necessity of an orderly and authoritative conduct of war. It goes to show that the principle of war was early recognized by the Osage as the surest means by which not only tribal and individual life might be safeguarded against strange and hostile tribes, but also as the means by which the tranquil enjoyment of game and other natural products of their environment might be won. It is to this coveted tranquillity that the closing lines of many of the rituals refer, invariably likening it to a "serene day." This degree employs ritual almost entirely, there being only 10 songs. The native ritual comprises 57 typewritten pages, of which a large part has been translated.

In the spring of 1913 Mr. La Flesche obtained the Rush Mat Weaving degree of the Puma and Black Bear gentes. Only the "Seven Songs" spoken of before, with various ceremonial forms, are employed in this degree, the "Six Songs" being entirely omitted. The distinguishing features are the ceremonial weaving of the rush mat for the sacred case in which were enshrined the bird and other sacred objects, the renewal of all the articles that make up the sacred bundle, and the ceremonial stitching of the ends of the case. In some respects this is one of the most extraordinary degrees of the Osage that Mr. La Flesche has yet observed, since in its performance there are used 70 brass kettles, 70 red-handled knives, and 70 awls in making the various articles, all of which the votary is obliged to furnish, together with other expensive articles that constitute the fees of the initiator and other officiating No^oho^ozhi^{ga}, as also 70 pieces of choice jerked meat for distribution among the members attending the initiation. Three rituals not used in the other degrees are employed in this, namely, the Green Rush ritual, the Bark ritual, and the Stitching and Cutting ritual. There are 61 pages of Osage text, about half of which have been transcribed.

Mr. La Flesche also obtained the rituals and songs of the Washabe Athi^a, "The Carrying of a Dark Object," with full description of the various processions and ceremonial forms. This is a war ceremony, which, although not counted as a degree, is a rite to which the seven degrees lead. The name of this ceremony is derived from the war insignia, which is the charcoal ceremonially prepared from certain sacred trees, and which symbolizes the black marks denoting the birds and animals used to typify strength, courage, and fleetness. Mr. La Flesche's Osage informant regards this as the final act of the seven degrees. The Osage text comprises 90 pages, nearly one-half of which has been transcribed, together with 36 songs, which have been transcribed by Miss Fletcher, and 7 diagrams.

Mr. La Flesche was fortunate enough to procure the sacred bundle of the Deer gens and the reed-whistle bundle of the Wind gens; the contents of the latter are of exceptional interest. Mrs. Brogahige, one of the ceremonial weavers of the Osage, at considerable sacrifice to herself, presented Mr. La Flesche two sacred looms, one of which is used in weaving the buffalo-hair case, and the other in weaving the rush case for the sacred bird. These packs, together with specimens of ceremonially made burden straps which Mr. La Flesche collected, have been placed in the National Museum.

Dr. Franz Boas, honorary philologist, continued the preparation of the material for the Handbook of American Indian Languages. As stated in the last annual report, the manuscript of the grammar of the Chukchee language, to appear in Part 2 of this handbook, was

completed and in its final form was discussed with the author, Mr. Waldemar Bogoras, during the visit of Dr. Boas to Berlin in the summer of 1912. The results of these discussions were embodied in the work, the manuscript was delivered, and the typesetting commenced. At the same time Dr. Boas studied the Koryak texts collected by Mr. Bogoras, published in accordance with the plan previously outlined, at the expense of the American Ethnological Society, and the indispensable references were embodied in the grammatical sketch.

The Coos grammar by Dr. Leo J. Frachtenberg was completed, so far as the work of the editor, Dr. Boas, is concerned, the page proofs having been finally revised.

The manuscript for the Siuslaw grammar, also by Dr. Frachtenberg, was submitted and the editing considerably advanced; this will be completed as soon as the entire series of Siuslaw texts are in print, a work that has been undertaken under Dr. Boas's editorship by Columbia University. All the collected texts are now in type, so that examples can be added to the manuscript of the grammar.

Dr. Frachtenberg remained in Siletz, Oreg., throughout the year for the purpose of revising on the spot the materials on the Oregon languages. He was engaged in collecting and arranging the Alsea material for Part 2 of the Handbook of Languages, and in preparing for the discussion of his Molala linguistics. The rapid disappearance of the Calapooya may make it necessary, however, to complete the field work on the language of this people before closing the work on the other manuscripts, even though this procedure may entail delay in the printing of the volume.

Dr. Alexander F. Chamberlain, of Clark University, who has undertaken the preparation of a grammar of the Kutenai language, expects to deliver his manuscript early in the new fiscal year. The printing of this sketch must necessarily be delayed until the text material is available in print.

Miss Haessler continued her preparations for a careful revision of the Dakota Dictionary by Riggs, a work made necessary by reason of the need of greater precision in phonetics and translation, as well as of a more systematic arrangement of the material. Miss Haessler expects to complete all the preliminary work by the summer of 1914, so that, should facilities be available, she will then be able to undertake the required field work.

Miss Frances Densmore continued her studies in Indian music, devoting special attention to that of the Sioux, and during the year submitted three papers, comprising 252 pages of manuscript, original phonographic records and musical transcription of 107 songs, and 23 original photographic illustrations. Three subjects have been ex-

haustively studied and a fourth is represented in such manner that the results may be regarded as ready for publication. The three principal subjects are: The sacred stones, dreams about animals, and the buffalo hunt. The fourth subject referred to relates to the war-path and is represented by about 20 songs, but it awaits further study of the military societies. A special group of songs consists of those which have been composed and sung by the Sioux in honor of Miss Densmore.

A study of the music of the Mandan and Hidatsa at Fort Berthold, N. Dak., was made by Miss Densmore in the summer of 1912, in cooperation with the Historical Society of the State of North Dakota. The results of this investigation consist of a manuscript of about 50 pages, with transcriptions of 40 songs.

Miss Densmore also read the proofs of Bulletin 53 (Chippewa Music—II), which is now in press.

Mr. W. H. Holmes, head curator of the department of anthropology of the United States National Museum, continued the preparation of the Handbook of American Archeology for publication by the bureau, as far as the limited time available for the purpose permitted. Aside from the preparation of the text and illustrations for parts 1 and 2 of this handbook, Mr. Holmes made field observations among the ancient mica mines in western North Carolina and among mounds and village sites in South Carolina and Georgia. He also visited a number of museums for the purpose of examining the collections of archeological material, among them being the museums of Boston, Andover, New York City, Philadelphia, Columbus, Chicago, Milwaukee, Madison, Davenport, and St. Louis.

Mr. D. I. Bushnell, jr., made good progress in the compilation of the Handbook of Aboriginal Remains East of the Mississippi, the manuscript material for which, recorded on cards, now approximates 160,000 words. The collated material has been derived from (1) replies to circular letters addressed to county clerks in all of the States east of the Mississippi, (2) communications from various societies and individuals, and (3) publications pertaining to the subject of American antiquities. It is gratifying to state that there are very few areas not covered by the material already in hand, and it is expected that through the systematic manner in which Mr. Bushnell is prosecuting the work the handbook will be as complete as it is practicable to make it by the time it is ready for publication.

The investigations conducted jointly in 1910 and 1911 by the bureau and the School of American Archæology have borne additional fruit. An extended memoir on the Ethnogeography of the Tewa Indians, by J. P. Harrington, was received and will appear as the

"accompanying paper" of the Twenty-ninth Annual Report, now in press. Three bulletins, namely, (No. 54) *The Physiography of the Rio Grande Valley, New Mexico, in Relation to Pueblo Culture*, by Edgar L. Hewett, Junius Henderson, and W. W. Robbins; (No. 55) *The Ethnobotany of the Tewa Indians*, by Barbara W. Freire-Marreco, W. W. Robbins, and J. P. Harrington; and (No. 56) *The Ethnozoology of the Tewa Indians*, by Junius Henderson and J. P. Harrington, were also presented as a part of the results of the joint expeditions and are either published or in process of printing. Mr. Harrington also made progress in the preparation of his report on the Mohave Indians, and Miss Freire-Marreco is expected to submit shortly an extended paper on the Yavapai tribe. There remains to be mentioned in this connection another memoir, namely, *An Introduction to the Study of the Maya Hieroglyphs*, by Sylvanus G. Morley; while not a direct product of the joint work of the bureau and the school, this is in a measure an outgrowth of it. The manuscript, together with the accompanying illustrations, has been submitted to the bureau, but is now temporarily in the author's hands for slight revision.

Since the publication of the *Handbook of American Indians*, through which additional popular interest in our aborigines has been aroused, it has been the desire to make a beginning toward the preparation of a series of handbooks devoted to the Indians of the respective States. The opportunity was fortunately presented toward the close of the fiscal year, when the bureau was enabled to enlist the aid of Dr. A. L. Kroeber, of the University of California, who has kindly consented to undertake the preparation of the initial volume of the series, to be devoted to the Indians of California. It is planned to present the material in each volume in as popular a form as practicable, in order that it may be made of the greatest use to schools, and it is hoped that the means may be soon available to make possible the extension of the series to other States.

Under a small allotment from the bureau, Mr. James Murie continued his studies of Pawnee ceremonies. He devoted special attention to the medicine rites, and on June 13, 1913, submitted a description of the ritual pertaining to the "Purification of the Buffalo Skull".

The transcription of the manuscript *French-Miami Dictionary* in the John Carter Brown Library at Providence, R. I., to which attention has been directed in previous reports, was finished by Miss Margaret Bingham Stillwell, who submitted the last pages of the vocabulary (which number 1,120 in all) early in January, 1913. The bureau is under obligations to Mr. George Parker Winship, librarian of the John Carter Brown Library, for his generous co-operation in placing this valued document at the disposal of the

bureau and to Miss Stillwell for the efficient manner in which this difficult task was accomplished.

In the latter part of the fiscal year Mr. Jacob P. Dunn, of Indianapolis, in whose hands the French-Miami Dictionary was placed for study, commenced the annotation of the transcription and the addition of English equivalents. This necessitated a journey to Oklahoma, where Mr. Dunn enlisted the services of a Miami Indian as an interpreter. The result of these studies consists of (a) the French-Miami-English Dictionary, from *Abbaizer* to *Cajeux*; (b) The History of Genesis, Chapter I, being Peoria text with Miami-English translation; (c) English-Miami Dictionary, from *Abandon* to *Aim*; (d) Wissakatcakwa Stories, recorded in Peoria by the late Dr. Gatschet, for which Mr. Dunn has made an interlinear translation.

The compilation of the List of Works Relating to Hawaii was continued by Prof. Howard M. Ballou, of the College of Hawaii, who from time to time has submitted additional titles. The recording of the material by more than one person necessarily resulted in more or less inconsistency in form; consequently the manuscript, which consists of many thousands of cards, has been in need of editorial revision in order to insure uniformity. For this revision the bureau has been fortunate in enlisting the services of Mr. Felix Neumann, an experienced bibliographer, who is making progress in the work.

PUBLICATIONS.

The editorial work of the bureau has been conducted as usual by Mr. J. G. Gurley, editor. The following publications were issued during the year:

Twenty-eighth Annual Report, containing "accompanying papers" as follows: (1) Casa Grande, by Jesse Walter Fewkes; (2) Antiquities of the Upper Verde River and Walnut Creek Valleys, Arizona, by Jesse Walter Fewkes; (3) Preliminary Report on the Linguistic Classification of Algonquian Tribes, by Truman Michelson.

Bulletin 30, Handbook of American Indians North of Mexico, edited by Frederick Webb Hodge. By concurrent resolution of Congress, in August, 1912, a reprint of this bulletin was ordered in an edition of 6,500 copies, of which 4,000 were for the use of the House of Representatives, 2,000 for the use of the Senate, and 500 for the use of the bureau. This reprint, in which were incorporated such desirable alterations as could be conveniently made without affecting the pagination of the work, was issued in January, 1913.

Bulletin 52, Early Man in South America, by Aleš Hrdlička, in collaboration with William H. Holmes, Bailey Willis, Fred. Eugene Wright. and Clarence N. Fenner.

Bulletin 54, The Physiography of the Rio Grande Valley, New Mexico, in Relation to Pueblo Culture, by Edgar Lee Hewett, Junius Henderson, and Wilfred William Robbins.

The work on the other publications during the year may be summarized as follows:

Twenty-ninth Annual Report ("accompanying paper," *The Ethnogeography of the Tewa Indians*, by John Peabody Harrington). Manuscript prepared for the printers and nearly half of the composition finished.

Thirtieth Annual Report ("accompanying papers": (1) *Animism and Folklore of the Guiana Indians*, by Walter E. Roth; (2) *Tsimshian Mythology*, by Franz Boas; (3) *Ethnobotany of the Zuni Indians*, by Matilda Coxe Stevenson). Editing of the third paper and to a considerable extent that of the first paper completed.

Bulletin 40, Handbook of American Indian Languages, by Franz Boas—Part 2. Work on the Coos section nearly finished and composition of the Chukchee section begun. Two sections (Takelma and Coos) are now "made up," aggregating 429 pages.

Bulletin 46, A Dictionary of the Choctaw Language, by Cyrus Byington, edited by John R. Swanton and H. S. Halbert. The editors have revised two galley proofs of the Choctaw-English section of this dictionary and have practically finished preparation for the printers of the English-Choctaw section. The first part of this bulletin is now in process of paging.

Bulletin 53, Chippewa Music—II, by Frances Densmore. Manuscript edited and the several proofs read, including proofs of 180 pieces of music. At the end of the year the bulletin was held in the Printing Office awaiting receipt of the necessary paper stock.

Bulletin 55, Ethnobotany of the Tewa Indians, by Barbara Whitchurch Freire-Marreco, Wilfred William Robbins, and John Peabody Harrington. Manuscript edited and the work in galley form at the close of the year.

Bulletin 56, Ethnozoology of the Tewa Indians, by Junius Henderson and John Peabody Harrington. Manuscript edited and the work in page form at the close of the year.

In accordance with the act of Congress approved August 23, 1912, the entire stock of publications of the bureau, with the exception of a few copies of each available work which have been retained at the Smithsonian Institution for special purposes, was transferred to the Government Printing Office in October, 1912, for distribution from the office of the superintendent of documents on order from the bureau. It has been found that this plan of distribution is highly successful, and, of course, much less expensive to the bureau.

The correspondence relating to publications, of which 15,070 were distributed during the year, was conducted under the immediate

supervision of Miss Helen Munroe, of the Smithsonian Institution. The distribution of the publications may be summarized as follows:

Series:	Copies.
Report volumes and separate papers.....	3, 895
Bulletins.....	11, 040
Contributions to North American Ethnology.....	15
Introductions.....	7
Miscellaneous publications.....	113
	<hr/> 15, 070

The demand for the Handbook of American Indians (Bulletin 30) continues unabated, by reason of the wide scope of the work, its popular form of treatment, and its usefulness to schools. There is an increasing demand for publications relating to Indian arts and crafts, and to archeology. The activity in the establishment of organizations of Camp Fire Girls throughout the country has resulted in a flood of requests for information relative to Indian customs, names, etc.

ILLUSTRATIONS.

As in the past, the preparation of illustrations for use in connection with the publications of the bureau, as well as the making of photographic portraits of the members of visiting deputations of Indians, continued in the immediate charge of Mr. De Lancey Gill, illustrator, whose work during the year included the making of negatives of 113 visiting Indians and of 93 miscellaneous ethnologic subjects; he also developed 298 negatives exposed by members of the bureau in their field work, printed 975 photographs for official publication, exchange, and presentation to Indians, and prepared 105 drawings for reproduction as illustrations for the publications of the bureau.

The tribes or pueblos represented by Indians who visited Washington during the year are: Acoma, Apache, Cheyenne, Chippewa, Cochiti, Crow, Isleta, Kiowa, Osage, Passamaquoddy, Ponca, San Juan, Santa Clara, Shoshoni, Sioux, Taos, and Wichita. Among the more important Indians whose portraits were made may be mentioned Plenty Coups and Medicine Crow (Crow tribe), Big Man and Iron Bear (Brulé Sioux), Hollow Horn Bear, Red Cloud, and Red Hawk (Teton Sioux), Daybwawindung (Chippewa), and Two Moons (Cheyenne). Many requests are made by correspondents for prints from the large collection of negatives in possession of the bureau, but it has not been possible to supply these, owing to lack of means, although in many cases they are desired for educational purposes. The series of photographs of representative Indians, from 55 tribes, which was made during the last fiscal year for special exhibition at the New York Public Library, has been borrowed from the bureau by the Public Library Commission of Indiana for exhibition in the public libraries throughout the State. In the work of the

photographic laboratory Mr. Gill was assisted by Mr. Walter J. Stenhouse.

LIBRARY.

The library of the bureau continued in immediate charge of Miss Ella Leary, librarian, assisted by Mrs. Ella Slaughter. During the year the accessions comprised 562 volumes (of which 129 were purchased) and 244 pamphlets, bringing the total number of volumes in the library to 18,532, and the pamphlets to 12,744. The periodicals currently received by the bureau, of which there are several thousand unbound parts, number 629; of these all but 18 are obtained in exchange for the bureau's publications. Special attention was paid during the year to filling lacunæ in the periodical series.

The cataloguing kept apace with the new accessions, and some progress was made in cataloguing ethnologic and related articles in the earlier serials. A monthly bulletin for the use of the members of the bureau staff was compiled and posted by the librarian, who also made a beginning in the preparation of a list of writings on the music of American Indians.

As in the past, it was necessary to draw on the collections of the Library of Congress, about 300 volumes having been borrowed during the year. On the other hand, the library of the bureau is frequently consulted by officers of the departments of the Government, as well as by students not connected with the Smithsonian Institution.

While many volumes are still without binding, the condition of the library in this respect has greatly improved during the last few years; 493 volumes were bound at the Government Printing Office during the year.

COLLECTIONS.

The following collections were made by the bureau or by members of its staff during the fiscal year and transferred to the National Museum:

- 54311. Six photographs (unmounted) taken by A. J. Horswill, San Jose, Mindoro, P. I., among the natives of Mindoro Island. Gift to the bureau by Munn & Co., New York.
- 54465. Sacred pack of the Fox Indians of Iowa. Purchased for the bureau by Dr. Truman Michelson.
- 54691. Five pieces of cotton painted with Assyrian subjects. Received by the bureau from an unknown source.
- 54798. Three sacred looms and seven burden straps of the Osage Indians. Collected by Francis La Flesche.
- 54933. Three fragments of Indian pottery found at Red Willow, Nebr., by Mrs. Ada Buck Martin, by whom they were presented.
- 54934. Sacred bundle of the Fox Indians. Purchased through Dr. Truman Michelson.

54946. Two sacred bundles of the Osage Indians. Purchased by Francis La Flesche.
55002. Sacred bundle of the Fox Indians. Purchased through Dr. Truman Michelson.
55075. An Osage buffalo-hair rope (reata) and an Osage woven belt. Purchased through Francis La Flesche.
55234. Two ethnological objects from the natives of British Guiana, presented to the bureau by Dr. Walter E. Roth, of Pomeroon River, British Guiana.
55323. Set of five plum-seed gaming dice of the Omaha Indians and a bottle of seeds used by the same Indians as perfume. Presented by Francis La Flesche.
55420. Pair of Osage ceremonial moccasins and an Osage ceremonial "pipe." Presented by Francis La Flesche.

PROPERTY.

As stated in previous reports, the property of the bureau of greatest value consists of its library, manuscripts for reference or publication, and photographic negatives. A reasonable number of cameras, dictagraphs, and other apparatus, chiefly for use in the field, as well as a limited stock of stationery and office supplies, necessary office furniture, and equipment, are also in possession of the bureau. The sum of \$893.21 was expended for office furniture (including fire-proof filing cases) during the year, \$452.57 for apparatus (including typewriters, cameras, dictagraphs, etc.), and \$258.45 for books and periodicals.

The manuscripts of the bureau, many of which are of extreme value, are deposited in metal cases in a small room in the north tower of the Smithsonian Building, which should be made as nearly fireproof as possible. Requests for a small appropriation to protect the manuscripts against possible destruction have been made in the past, but unfortunately the means have not been granted. The manuscripts, which have been in the immediate care of Mr. J. N. B. Hewitt, have increased from time to time during the year, chiefly by the temporary deposit of materials preparatory to editing for publication. Mention may here be made, however, of the gift of some manuscript Chippewa letters from the Rev. Joseph A. Gilfillan, and the acquirement of a photostat copy of the Motul-Maya Dictionary, made at the expense of the bureau from the original in the John Carter Brown Library, at Providence, R. I., as elsewhere noted. Mention may also be made of various vocabularies or parts of vocabularies, 23 items in all, which were restored to the bureau by Mrs. Louisa H. Gatschet, who found them among Dr. Gatschet's effects.

MISCELLANEOUS.

Quarters.—Since the beginning of 1910 the offices of the bureau have occupied nine rooms in the north tower of the Smithsonian Building, and a room (the office of the ethnologist-in-charge) on the

north side of the third floor of the eastern wing, while the library has occupied the entire eastern gallery of the large exhibition hall on the first floor, and the photographic laboratory part of the gallery in the southeastern section of the old National Museum building. While the natural lighting of the rooms in the north tower, by reason of the thickness of the walls and the narrowness of the windows, is inadequate, and the distance from the library and the photographic laboratory makes them not readily accessible, the office facilities are far better than when the bureau was housed in cramped rented quarters. Aside from the photographic laboratory and one room in the north tower, no part of the bureau's quarters is provided with running water. It is presumed that after the rearrangement of the large exhibition hall in the Smithsonian building and its adaptation to general library purposes the facilities of the bureau library will be greatly improved.

Office force.—The office force of the bureau has not been augmented, although the correspondence has greatly increased owing to the growing demand on the bureau for information respecting the Indians. The copying of the rough manuscripts, field notes, etc., prepared by members of the bureau, as well as the verification of quotations, bibliographic citations, and similar work of a minor editorial nature, necessitate the employment of temporary aid from time to time. Most of the answers to correspondents who desire information of a special character have been prepared by the ethnologist-in-charge, but every member of the bureau's scientific staff is frequently called on for the same purpose to furnish information pertaining to his particular field of knowledge.

RECOMMENDATIONS.

It is difficult to extend the systematic researches of the bureau along new and necessary lines without an increase of appropriations. When a special research is undertaken, several years are often required to finish it, consequently the prospective income of the bureau for a considerable period is required to carry out adequately the work in hand. Opportunities are often presented for conducting investigations in new fields which have to be neglected owing to lack of means. An increase in the appropriations of the bureau has been urged for several years, but unfortunately the estimates have not been met with additional funds.

Respectfully submitted.

F. W. HODGE,
Ethnologist-in-charge.

DR. CHARLES D. WALCOTT,
*Secretary of the Smithsonian Institution,
Washington, D. C.*

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1913.

The appropriation made by Congress for the support of the service during the year, including the allotment for printing and binding, was \$32,200 (the same amount as appropriated for the past five years), and the repayments from private and departmental sources for services rendered aggregated \$4,249.13, making the total available resources for carrying on the system of international exchanges \$36,449.13.

The work of the service is increasing at such a rapid rate that it will be necessary in the near future to ask Congress to supply additional funds. More money is needed to meet freight charges on the increased number of boxes now shipped abroad, and also for miscellaneous incidental expenses incurred in connection with the work of the service. In 1913, 66 per cent more packages were handled than in 1908, when the appropriation was first placed at \$32,200, and 678 more boxes were dispatched. By means of various economies and improvements in methods this increase in the volume of business has been provided for without adding to the total cost of the service; but little more can be done in this direction.

During the year 1913 the total number of packages handled was 338,621, an increase of 23,129, as compared with the preceding year. The weight of these packages was 593,969 pounds, an increase of 25,257 pounds.

The number and weight of the packages of different classes are indicated in the following table:

Number and weight of packages sent and received.

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	140,345	.....	103,820	.....
Publications received in return for parliamentary documents..	.....	2,085	.....	11,789
United States departmental documents sent abroad.....	78,937	.....	173,962	.....
Publications received in return for departmental documents..	.....	9,923	.....	18,847
Miscellaneous scientific and literary publications sent abroad..	62,446	.....	158,227	.....
Miscellaneous scientific and literary publications received from abroad for distribution in the United States.....	.....	44,885	.....	127,333
Total.....	281,728	56,893	436,009	157,969
Grand total.....	338,621		593,969	

As was somewhat fully explained in last year's report, the disparity between the number of packages dispatched and those received in behalf of the Government is not so great as indicated by these figures. Packages sent abroad usually contain only a single publication each, while those received in return often comprise many volumes. In the case of publications received in exchange for parliamentary documents and some others the term "package" is applied to large boxes containing a hundred or more publications. No lists of these are made in the Exchange Office, as the boxes are forwarded to their destinations unopened. It is also a fact that many returns for publications sent abroad reach their destinations direct by mail and not through the Exchange Service.

Many governmental and scientific establishments and individuals, both in this country and abroad, have sought the aid of the International Exchange Service during the year in procuring, as gifts or exchanges, certain especially desired publications. The correspondence which this work entails upon the Exchange Service is considerable and is growing in volume from year to year. Sometimes information collected by this Government, but not to be found in published reports, is requested. In these instances the various governmental bureaus furnish the desired data in typewritten form. As an example of a request of this kind received during the year, a case may be mentioned in which valuable statistics concerning blister copper were supplied by the Bureau of the Census and the Bureau of Mines for transmission to the high commissioner of the Commonwealth of Australia for the use of his home Government. Another request of this character which was complied with was one received through the Department of State from the minister of public works and mines of New Zealand for publications containing the laws and regulations with respect to the boring, mining, and storage of petroleum in the United States. In this instance, while the Bureau of Mines was in a position to furnish information on the mining of petroleum on Indian reservations, it was necessary for the Institution to write to the principal States having laws on the subject in question in order to obtain the desired data. It may, however, be added in this connection that the Bureau of Mines is engaged in collecting, arranging, and annotating all the laws, both National and State, relating to all branches of mining, including the petroleum industry, and that a copy of this work, when issued, will be furnished the Institution for presentation to the minister of public works.

The Department of State, in referring a communication from the librarian of the Brazilian Press Association at Rio de Janeiro requesting aid in the establishment of a library in that city to be composed entirely of the works of American writers, stated that while the department itself had no facilities for obtaining such publications it



PHOTOGRAPH OF PORTION OF 2,000 PACKAGES OF THE PROCEEDINGS OF THE EIGHTH INTERNATIONAL CONGRESS OF APPLIED CHEMISTRY RECEIVED BY THE EXCHANGE SERVICE FOR DISTRIBUTION ABROAD.

was naturally interested in having the more important works of American writers, as well as the governmental documents containing statistical information, placed within easy reach of our neighbors in the Latin-American countries, and that it would be gratifying to the department if the Smithsonian Institution should find it practicable to send to the association such works and statistics regarding science, literature, agriculture, industry, commerce, etc., as might seem suitable. The desire of the Brazilian Press Association was brought to the attention of certain governmental establishments and also of many scientific and literary organizations throughout the United States. The majority of these organizations gave the matter favorable attention, some of them sending complete sets of their publications and adding the name of the American library to their lists to receive future issues. The Smithsonian Institution, I need hardly add, contributed a selection of its own publications. Altogether, more than 1,200 publications were received and transmitted to the Brazilian Press Association through the International Exchange Service as a nucleus for the proposed library.

The chief of the bureau of publications of the Department of Agriculture and Forestry, Peking, China, while attending the Seventeenth International Dry Farming Congress as a delegate from his Government, forwarded to this Institution, for distribution among the various State agricultural experiment stations, a number of copies of three issues of an agricultural journal published by his bureau, with the request that such bulletins as the experiment stations might issue from time to time be sent to his bureau in exchange. This matter was brought to the attention of the various stations, most of which complied with the request by sending copies of their bulletins and listing the name of the Chinese Department of Agriculture to receive their publications regularly in the future.

Many requests for documents are received through the various exchange bureaus abroad, whose services are made use of by this Institution in procuring foreign publications for correspondents in this country. In this connection it may be mentioned that the Government of India invariably requires that requests from establishments in this country for any extended series of Indian official documents be made through the Exchange Service. In such instances the status of the society or establishment making the request is looked into, and statistics and other information relative thereto are furnished the Government of India with a recommendation, when deemed advisable, that the desired documents be furnished.

The foregoing are only a few of the important instances in which the Institution has aided foreign establishments in obtaining publications, in pursuance of a policy of international helpfulness, which is of benefit to the larger intellectual and economic interests of both

the United States and foreign countries. Many other requests of similar nature have been received from correspondents in this country and abroad.

The Institution continues to assist the Library of Congress in completing its collections of foreign governmental documents.

Mention was made last year of the fact that packages containing scientific and literary publications received from establishments and individuals in the United States for transmission through the Exchange Service to miscellaneous addresses in the various Provinces of the Union of South Africa were forwarded to certain governmental establishments in those Provinces for distribution, and that the Government of the Union had been approached with a view to having only one agency for the entire Union. It is now gratifying to state that this request has been complied with, the Government Printing Works at Pretoria having been designated to carry on the exchange work. Packages received in the future for addresses in any of the Provinces of the Union will therefore be transmitted to the Government Printing Works for distribution. This change will effect a saving to the Institution in freight charges, and will also, I have no doubt, improve the service with South Africa. If a similar arrangement could be made with the Commonwealth of Australia it would have decided advantages over the present method of forwarding consignments to six different addresses in that Commonwealth for distribution. The matter is now being considered by the Speaker of the House of Representatives of the Commonwealth of Australia, who is also chairman of the library committee. The Institution has brought to the attention of that official the advantages to be derived from having one central exchange agency in Australia and has urged him to use his best endeavors to have the matter favorably considered by his Government.

The Egyptian Exchange Agency has been transferred from the Egyptian Survey Department to the newly formed Government Publications Department, consignments for distribution in that country now being forwarded in care of the Superintendent of the Government Publications Office, Printing Department, Cairo. It should be stated as a matter of record in this connection that the businesslike basis upon which the exchange service between Egypt and the United States has been placed during the Survey Department's five years' connection therewith has resulted in the prompt delivery of packages to correspondents in both countries.

A circular was received during the year from the Republic of Mexico, stating that a Service of Exchanges had been established in the Department of Public Works.

Of the 2,587 boxes used in forwarding exchanges to foreign bureaus and agencies for distribution (an increase of 192 over 1912),

386 boxes contained full sets of United States official documents for authorized depositories, and 2,201 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
ARGENTINA.....	43	July 24, Aug. 24, Sept. 25, Oct. 23, Nov. 25, 1912; Jan. 18, Feb. 26, Apr. 3, June 4, 20, 1913.
AUSTRIA.....	99	July 10, Aug. 7, Sept. 11, Oct. 9, Dec. 11, 1912; Jan. 8, Feb. 5, Mar. 12, Apr. 9, May 14, June 11, 20, 1913.
BELGIUM.....	77	July 6, 27, Aug. 17, 31, Sept. 20, Oct. 12, Nov. 15, Dec. 7, 1912; Jan. 11, Feb. 1, Mar. 8, 29, Apr. 12, May 3, June 7, 28, 1913.
BOLIVIA.....	5	Aug. 28, Nov. 30, 1912; Feb. 27, Apr. 3, June 9, 1913.
BRAZIL.....	42	July 24, Aug. 24, Sept. 25, Oct. 23, Nov. 25, Dec. 19, 1912; Jan. 16, Feb. 26, Apr. 3, June 5, 20, 1913.
BRITISH COLONIES.....	17	July 6, 13, Aug. 3, 10, 17, Sept. 7, 21, Nov. 16, 1912; Feb. 8, 15, Mar. 22, 29, Apr. 18, May 2, 24, June 6, 27, 1913.
BRITISH GUIANA.....	5	Sept. 19, Oct. 31, 1912; Jan. 22, Feb. 28, June 16, 1913.
BULGARIA.....	6	Jan. 6, Feb. 27, Apr. 5, June 10, 1913.
CANADA.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
CHILE.....	28	July 24, Aug. 24, Sept. 25, Nov. 25, 1912; Jan. 18, Feb. 26, Apr. 3, June 5, 20, 1913.
CHINA.....	18	July 30, 31, Aug. 31, Sept. 19, Nov. 8, Dec. 2, 13, 1912; Jan. 3, 29, Feb. 1, Mar. 1, 6, 13, Apr. 29, May 5, June 10, 20, 1913.
COLOMBIA.....	20	Aug. 28, Oct. 23, Nov. 30, 1912; Jan. 18, Feb. 26, Apr. 3, June 9, 20, 1913.
COSTA RICA.....	16	July 24, Aug. 28, Sept. 26, Nov. 30, 1912; Jan. 18, Feb. 26, Apr. 3, June 9, 20, 1913.
CUBA.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
DENMARK.....	35	July 20, Aug. 15, Sept. 19, Oct. 17, Nov. 18, Dec. 12, 1912; Jan. 16, Feb. 14, Mar. 20, Apr. 15, May 21, June 24, 1913.
ECUADOR.....	6	Aug. 28, Nov. 30, 1912; Jan. 29, Feb. 27, May 1, June 9, 1913.
EGYPT.....	13	Aug. 10, Sept. 14, Oct. 12, Nov. 23, Dec. 28, 1912; Feb. 8, Mar. 22, Apr. 22, May 31, June 25, 1913.
FRANCE.....	230	July 11, 25, Aug. 15, 29, Sept. 19, Oct. 3, 24, Nov. 13, Dec. 5, 26, 1912; Jan. 16, 30, Feb. 13, Mar. 6, 27, Apr. 10, 24, May 22, June 19, 20, 1913.
GERMANY.....	422	July 2, 9, 16, 23, 30, Aug. 6, 13, 20, 27, Sept. 3, 10, 17, 24, Oct. 1, 8, 15, 22, 29, Nov. 7, 19, 26, Dec. 3, 10, 17, 24, 1912; Jan. 7, 14, 21, 28, Feb. 4, 11, 19, 25, Mar. 11, 18, 25, Apr. 1, 8, 15, 22, 29, May 6, 13, 20, 27, June 3, 10, 17, 24, 1913.
GREAT BRITAIN AND IRELAND.....	439	July 6, 13, 20, 27, Aug. 3, 10, 17, 24, 31, Sept. 7, 14, 21, 28, Oct. 5, 12, 19, 26, Nov. 5, 9, 16, 23, 30, Dec. 7, 14, 21, 1912; Jan. 4, 11, 18, 25, Feb. 1, 8, 15, 21, Mar. 1, 8, 15, 22, 29, Apr. 4, 11, 18, 25, May 2, 9, 16, 24, 31, June 6, 14, 21, 27, 1913.
GREECE.....	19	Aug. 31, Oct. 31, 1912; Jan. 3, Feb. 27, Apr. 5, June 18, 20, 1913.
GUATEMALA.....	6	Aug. 28, Nov. 30, 1912; Jan. 29, Feb. 27, May 1, June 9, 1913.
HAWAII.....	7	July 30, Sept. 26, 1912; Jan. 3, Feb. 26, Apr. 3, June 7, 20, 1913.
HONDURAS.....	6	Aug. 28, Nov. 30, 1912; Jan. 29, Feb. 27, May 1, June 9, 1913.
HUNGARY.....	45	July 10, Aug. 7, Sept. 11, Oct. 9, Nov. 20, Dec. 11, 1912; Jan. 8, Feb. 5, Mar. 12, Apr. 9, May 14, June 11, 20, 1913.
INDIA.....	46	July 6, 13, 20, 27, Aug. 3, 10, 17, 24, 31, Sept. 7, 14, 21, 26, Oct. 5, 12, 26, Nov. 16, 30, Dec. 7, 14, 1912; Jan. 4, 18, 25, Feb. 8, 15, Mar. 1, 22, 29, Apr. 11, May 24, June 6, 27, 1913.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
ITALY.....	107	July 1, Aug. 10, Sept. 12, Oct. 12, Nov. 25, Dec. 28, 1912; Feb. 8, Mar. 22, Apr. 22, May 31, June 25, 1913.
JAMAICA.....	6	Sept. 17, Nov. 30, 1912; Jan. 30, Feb. 28, May 1, June 16, 1913.
JAPAN.....	61	July 20, Aug. 23, Sept. 20, Oct. 17, Nov. 25, Dec. 20, 1912; Jan. 21, Feb. 20, Mar. 20, Apr. 17, June 20, 1913.
KOREA.....	5	Sept. 17, Nov. 30, 1912; Feb. 28, May 1, June 28, 1913.
LIBERIA.....	5	Sept. 18, Nov. 30, 1912; Feb. 28, May 1, June 16, 1913.
LOURENÇO MARQUEZ..	2	Feb. 27, June 28, 1913.
MANITOBA.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
MEXICO.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
MONTENEGRO.....	2	Feb. 27, June 30, 1913.
NETHERLANDS.....	53	July 9, 30, Aug. 13, 27, Sept. 10, Oct. 8, Nov. 18, Dec. 10, 1912; Jan. 14, 29, Feb. 11, Mar. 11, 25, Apr. 8, May 6, 27, June 17, 20, 1913.
NEWFOUNDLAND.....	3	July 31, 1912; Mar. 29, June 30, 1913.
NEW SOUTH WALES...	31	July 25, Aug. 21, Sept. 24, Oct. 17, Nov. 23, 1912; Jan. 15, Feb. 20, Mar. 26, Apr. 16, May 26, June 23, 1913.
NEW ZEALAND.....	28	July 25, Aug. 21, Sept. 24, Oct. 18, Nov. 23, 1912; Jan. 15, 23, Feb. 20, Mar. 26, Apr. 16, May 26, June 23, 1913.
NICARAGUA.....	4	Nov. 30, 1912; Feb. 27, May 1, June 9, 1913.
NORWAY.....	35	July 20, Aug. 15, Sept. 20, Oct. 17, Nov. 18, 1912; Jan. 3, Feb. 14, Mar. 20, Apr. 15, May 21, June 24, 1913.
ONTARIO.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
PALESTINE.....	8	Feb. 28, May 31, 1913.
PARAGUAY.....	6	July 24, Aug. 27, Nov. 30, 1912; Feb. 27, Apr. 3, June 7, 1913.
PERU.....	18	July 24, Aug. 24, Sept. 25, Nov. 25, 1912; Jan. 18, Feb. 26, Apr. 3, June 5, 20, 1913.
PORTUGAL.....	28	July 20, Aug. 15, Sept. 20, Oct. 17, Nov. 18, 1912; Jan. 3, Feb. 14, Mar. 20, Apr. 15, May 21, June 30, 1913.
QUEBEC.....	7	July 30, Aug. 31, Dec. 2, 1912; Feb. 1, Mar. 13, May 5, June 20, 1913.
QUEENSLAND.....	20	July 25, Aug. 21, Sept. 24, Oct. 18, Nov. 23, 1912; Jan. 15, Feb. 20, Mar. 26, Apr. 16, May 26, June 23, 1913.
ROUMANIA.....	9	Aug. 28, Sept. 27, Nov. 25, 1912; Jan. 31, Feb. 27, Apr. 5, June 10, 1913.
RUSSIA.....	86	July 12, Aug. 8, Sept. 10, Oct. 10, Nov. 21, Dec. 21, 1912; Jan. 9, Feb. 6, Mar. 13, Apr. 10, May 15, June 12, 20, 1913.
SALVADOR.....	5	Aug. 28, Nov. 30, 1912; Feb. 27, May 1, June 9, 1913.
SERBIA.....	14	July 30, Aug. 29, Sept. 27, 1912; Jan. 3, Feb. 27, Apr. 5, June 10, 20, 1913.
SIAM.....	6	Sept. 18, Nov. 8, 1912; Jan. 3, Feb. 28, May 1, June 18, 1913.
SOUTH AUSTRALIA....	23	July 25, Aug. 21, Sept. 24, Oct. 17, Nov. 23, 1912; Jan. 15, Feb. 20, Mar. 26, Apr. 16, May 26, June 23, 1913.
SPAIN.....	35	Aug. 10, Sept. 12, Oct. 26, Nov. 30, Dec. 28, 1912; Feb. 8, Mar. 22, May 3, 31, June 25, 1913.
SWEDEN.....	65	July 11, Aug. 8, Sept. 12, Oct. 10, Nov. 21, Dec. 12, 1912; Jan. 9, Feb. 6, Mar. 13, Apr. 10, May 15, June 12, 20, 1913.
SWITZERLAND.....	64	July 6, 27, Aug. 17, 31, Sept. 20, Oct. 12, Nov. 15, Dec. 7, 28, 1912; Jan. 11, Feb. 1, Mar. 8, 29, Apr. 12, May 3, June 7, 28, 1913.
SYRIA.....	4	Sept. 18, 1912; Jan. 30, Apr. 26, June 10, 1913.
TASMANIA.....	14	July 20, 1912; Feb. 8, Mar. 8, 29, Apr. 25, May 24, June 27, 1913.
TRINIDAD.....	5	Sept. 17, Nov. 30, 1912; Feb. 28, May 1, June 28, 1913.
TURKEY.....	12	July 31, Aug. 31, Sept. 18, Oct. 31, Nov. 8, 1912; Jan. 3, Feb. 26, 28, Apr. 5, June 10, 1913.
UNION OF SOUTH AFRICA.	28	July 31, Aug. 29, Sept. 26, Oct. 30, Nov. 25, 1912; Jan. 22, 28, Feb. 27, Apr. 5, May 10, June 20, 1913.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
URUGUAY.....	19	July 24, Aug. 28, Sept. 26, Oct. 23, Nov. 25, 1912; Jan. 18, Feb. 26, Apr. 3, June 6, 20, 1913.
VENEZUELA.....	16	July 24, Aug. 28, Sept. 26, Nov. 30, 1912; Jan. 29, Feb. 26, Apr. 3, June 7, 1913.
VICTORIA.....	31	July 2, Aug. 21, Sept. 24, Oct. 13, Nov. 23, 1912; Jan. 15, Feb. 20, Mar. 26, Apr. 16, May 26, June 23, 1913.
WESTERN AUSTRALIA..	37	July 6, 13, Aug. 17, 24, Sept. 7, 14, 21, Oct. 12, Nov. 5, 16, 30, Dec. 7, 14, 1912; Jan. 4, 18, 25, Feb. 8, 15, Mar. 1, 29, Apr. 11, 25, May 24, June 6, 27, 1913.
WINDWARD AND LEE- WARD ISLANDS.	5	Oct. 31, Nov. 30, 1912; Feb. 28, May 1, June 16, 1913.

A part of the contents of a consignment forwarded under date of May 14 (boxes Nos. 1640-1646 and 7896) was damaged by water while in transit to the Central Statistical Commission in Vienna. Steps will be taken to duplicate as many of the damaged publications as are available for distribution.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

In accordance with treaty stipulations, and under the authority of the resolutions of Congress of March 2, 1867, and March 2, 1901, setting apart a certain number of documents for exchange with foreign countries, there are now sent regularly to depositories abroad 56 full sets of United States official publications and 36 partial sets. During the year the Province of Bombay and the Corporation of Glasgow were added to the list of recipients of full sets; and Finland, British Guiana, the Free City of Lübeck, and the Province of Madras to the list receiving partial sets. While Finland and the Province of Madras were added to the list of countries receiving partial sets in November, 1912, the Library of Congress has, so far as it was possible to do so, completed the series from 1902 to that time.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

ARGENTINA: Ministerio de Relaciones Exteriores, Buenos Aires.
AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.
AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.
BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)
BAVARIA: Königliche Hof- und Staats-Bibliothek, Munich.
BELGIUM: Bibliothèque Royale, Brussels.
BOMBAY: Secretary to the Government, Bombay.
BRAZIL: Bibliotheca Nacional, Rio de Janeiro.

- BUENOS AIRES:** Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
- CANADA:** Library of Parliament, Ottawa.
- CHILE:** Biblioteca del Congreso Nacional, Santiago.
- CHINA:** American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
- COLOMBIA:** Biblioteca Nacional, Bogota.
- COSTA RICA:** Oficina de Depósito y Canje Internacional de Publicaciones, San José.
- CUBA:** Secretaría de Estado (Asuntos Generales y Canje Internacional). Habana.
- DENMARK:** Kongelige Bibliotheket, Copenhagen.
- ENGLAND:** British Museum, London.
- FRANCE:** Bibliothèque Nationale, Paris.
- GERMANY:** Deutsche Reichstags-Bibliothek, Berlin.
- GLASGOW:** City Librarian, Mitchell Library, Glasgow.
- GREECE:** Bibliothèque Nationale, Athens.
- HAITI:** Secrétairerie d'État des Relations Extérieures, Port au Prince.
- HUNGARY:** Hungarian House of Delegates, Budapest.
- INDIA:** Department of Education (Books), Government of India, Calcutta.
- IRELAND:** National Library of Ireland, Dublin.
- ITALY:** Biblioteca Nazionale Vittorio Emanuele, Rome.
- JAPAN:** Imperial Library of Japan, Tokyo.
- LONDON:** London School of Economics and Political Science. (Depository of the London County Council.)
- MANITOBA:** Provincial Library, Winnipeg.
- MEXICO:** Instituto Bibliográfico, Biblioteca Nacional, Mexico.
- NETHERLANDS:** Library of the States General, The Hague.
- NEW SOUTH WALES:** Public Library of New South Wales, Sydney.
- NEW ZEALAND:** General Assembly Library, Wellington.
- NORWAY:** Storthingets Bibliothek, Christiania.
- ONTARIO:** Legislative Library, Toronto.
- PARIS:** Préfecture de la Seine.
- PERU:** Biblioteca Nacional, Lima.
- PORTUGAL:** Bibliotheca Nacional, Lisbon.
- PRUSSIA:** Königliche Bibliothek, Berlin.
- QUEBEC:** Library of the Legislature of the Province of Quebec, Quebec.
- QUEENSLAND:** Parliamentary Library, Brisbane.
- RUSSIA:** Imperial Public Library, St. Petersburg.
- SAXONY:** Königliche Oeffentliche Bibliothek, Dresden.
- SERBIA:** Section Administrative du Ministère des Affaires Étrangères, Belgrade.
- SOUTH AUSTRALIA:** Parliamentary Library, Adelaide.
- SPAIN:** Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
- SWEDEN:** Kungliga Bibliotheket, Stockholm.
- SWITZERLAND:** Bibliothèque Fédérale, Berne.
- TASMANIA:** Parliamentary Library, Hobart.
- TURKEY:** Department of Public Instruction, Constantinople.
- UNION OF SOUTH AFRICA:** State Library, Pretoria, Transvaal.
- URUGUAY:** Oficina de Canje Internacional de Publicaciones, Montevideo.
- VENEZUELA:** Biblioteca Nacional, Caracas.
- VICTORIA:** Public Library, Melbourne.
- WESTERN AUSTRALIA:** Public Library of Western Australia, Perth.
- WÜRTTEMBERG:** Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

ALBERTA: Legislative Library, Edmonton.
ALSACE-LORRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
BRITISH COLUMBIA: Legislative Library, Victoria.
BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
BULGARIA: Minister of Foreign Affairs, Sofia.
CEYLON: United States Consul, Colombo.
ECUADOR: Biblioteca Nacional, Quito.
EGYPT: Bibliothèque Khédiviale, Cairo.
FINLAND: Chancery of Governor, Helsingfors.
GUATEMALA: Secretary of the Government, Guatemala.
HAMBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
HESSE: Grossherzogliche Hof-Bibliothek, Darmstadt.
HONDURAS: Secretary of the Government, Tegucigalpa.
JAMAICA: Colonial Secretary, Kingston.
LIBERIA: Department of State, Monrovia.
LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
LÜBECK: President of the Senate.
MADRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public Department, Madras.
MALTA: Lieutenant Governor, Valetta.
MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
NEW BRUNSWICK: Legislative Library, Fredericton.
NEWFOUNDLAND: Colonial Secretary, St. John's.
NICARAGUA: Superintendente de Archivos Nacionales, Managua.
NORTHWEST TERRITORIES: Government Library, Regina.
NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
PANAMA: Secretaría de Relaciones Exteriores, Panama.
PARAGUAY: Oficina General de Inmigracion, Asuncion.
PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
ROUMANIA: Academia Romana, Bucharest.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
SIAM: Department of Foreign Affairs, Bangkok.
STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
UNITED PROVINCES OF AGRA AND OUDH: Under Secretary to Government, Allahabad.
VIENNA: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

The interparliamentary exchange of official journals is carried on under a resolution of the Congress approved March 4, 1909, setting aside such number as might be required, not exceeding 100 copies, of the daily issue of the Congressional Record for exchange, through the agency of the Smithsonian Institution, with the legislative chambers of such foreign Governments as might agree to send to the United States current copies of their parliamentary records or like publications. The purpose of this resolution was to enable the institution, on the part of the United States, to more fully carry into

effect the provisions of the convention concluded at Brussels in 1886, providing for the immediate exchange of the official journal.

The Governments of the Province of Buenos Aires, Liberia, and Queensland have entered into this exchange during the year. A complete list of the Governments to which the Congressional Record is now sent is given below:

Argentine Republic.	Italy.
Australia.	Liberia.
Austria.	New South Wales.
Baden.	New Zealand.
Belgium.	Portugal.
Brazil.	Prussia.
Buenos Aires, Province of.	Queensland.
Canada.	Roumania.
Cuba.	Russia.
Denmark.	Servia.
France.	Spain.
Great Britain.	Switzerland.
Greece.	Transvaal.
Guatemala.	Union of South Africa.
Honduras.	Uruguay.
Hungary.	Western Australia.

There are, therefore, at present 32 countries with which the immediate exchange is conducted. To some of these countries, however, two copies of the Congressional Record are sent, one to the upper and one to the lower House of Parliament—the total number transmitted being 37.

RULES GOVERNING THE TRANSMISSION OF EXCHANGES.

The circular containing the rules governing the transmission of exchanges has been revised, and is here reproduced for the information of those who may wish to make use of the facilities of the service in the forwarding of publications.

In effecting the distribution of its first publications abroad, the Smithsonian Institution established relations with certain foreign scientific societies and libraries, by means of which it was enabled to materially assist institutions and individuals of this country in the transmission of their publications abroad, and also foreign societies and individuals in distributing their publications in the United States.

In recent years the Smithsonian Institution has been charged with the duty of conducting the official Exchange Bureau of the United States Government, through which the publications authorized by Congress are exchanged for those of other Governments; and by a formal treaty it acts as intermediary between the learned bodies and scientific and literary societies of the contracting States for the reception and transmission of their publications.

Attention is called to the fact that this is an international and not a domestic exchange service, and that it is designed to facilitate exchanges between the United States and other countries only. As exchanges from domestic sources for addresses in Hawaii, the Philippine Islands, Porto Rico, and other territory

subject to the jurisdiction of the United States do not come within the designation "international," they are not accepted for transmission.

Packages prepared in accordance with the rules enumerated below will be received by the Smithsonian Institution from persons or institutions of learning in the United States and forwarded to their destinations abroad through its own agents or through the various exchange bureaus in other countries. The Smithsonian agents and many of these bureaus will likewise receive from correspondents in their countries such publications for addresses in the United States and territory subject to its jurisdiction as may be delivered to them under rules similar to those prescribed herein, and will forward them to Washington, after which the Institution will undertake their distribution.

On the receipt of a consignment from a domestic source it is assigned a "record number," which number is placed on each package contained therein. After the packages have been recorded they are packed in boxes with packages from other senders intended for the same countries, and are forwarded by fast freight to the bureaus or agencies abroad which have undertaken to distribute exchanges in those countries. To Great Britain and Germany shipments are made weekly; to all other countries at intervals not exceeding one month.

Consignments from abroad for correspondents in the United States and its outlying possessions are distributed by mail under frank.

The Institution assumes no responsibility in the transmission of packages intrusted to its care, but at all times uses its best endeavors to forward exchanges to their destinations as promptly as possible.

RULES.

The rules governing the Smithsonian International Exchange Service are as follows:

1. Consignments from correspondents in the United States containing packages for transmission abroad should be addressed "Smithsonian Institution, International Exchanges, Washington, D. C."

2. In forwarding a consignment the sender should mail a letter to the Institution, stating by what route it is being shipped, and the number of boxes or parcels which it comprises. A list giving the name and address of each consignee should also be furnished.

3. Packages should be legibly addressed, using, when practicable, the language of the country to which they are to be forwarded. In order to avoid any possible dispute as to ownership, names of individuals should be omitted from packages intended for societies and other establishments.

4. Packages should be securely wrapped in stout paper and, when necessary, tied with strong twine. Cardboard should be used in some instances to protect plates from crumpling.

5. Letters are not permitted in exchange packages.

6. If donors desire acknowledgments, packages may contain receipt forms to be signed and returned by the establishment or individual addressed. Should publications be desired in exchange, a request to that effect may be printed on the receipt form or on the package.

7. Exchanges intended for transmission abroad must be delivered to the Smithsonian Institution *with all charges to Washington prepaid*.

8. The work carried on by the International Exchange Service is not in any sense of a commercial nature, but is restricted to the transmission of publications sent as exchanges or donations. Books ordered through the trade are therefore necessarily excluded.

9. Specimens are not accepted for distribution, except when permission has been obtained from the Institution.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges are transmitted:

ALGERIA, *via* France.

ANGOLA, *via* Portugal.

ARGENTINA: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.

AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.

AZORES, *via* Portugal.

BELGIUM: Service Belge des Échanges Internationaux, Rue du Musée 5, Brussels.

BOLIVIA: Oficina Nacional de Estadística, La Paz.

BRAZIL: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.

BRITISH COLONIES: Crown Agents for the Colonies, London.¹

BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.

BRITISH HONDURAS: Colonial Secretary, Belize.

BULGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.

CANARY ISLANDS, *via* Spain.

CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.

CHINA: Zi-ka-wai Observatory, Shanghai.

COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.

DENMARK: Kongelige Danske Videnskabernes, Selskab, Copenhagen.

DUTCH GUIANA: Surinaamsche Koloniale Bibliothek, Paramaribo.

ECUADOR: Ministerio de Relaciones Exteriores, Quito.

EGYPT: Government Publications Office, Printing Department, Cairo.

FRANCE: Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.

GERMANY: Amerika-Institut, Berlin, N. W. 7.

GREAT BRITAIN AND IRELAND: Messrs. William Wesley & Son, 28 Essex Street, Strand, London.

GREECE: Bibliothèque Nationale, Athens.

GREENLAND, *via* Denmark.

GUADELOUPE, *via* France.

GUATEMALA: Instituto Nacional de Varones, Guatemala.

GUINEA, *via* Portugal.

HAITI: Secrétaire d'État des Relations Extérieures, Port au Prince.

HONDURAS: Biblioteca Nacional, Tegucigalpa.

HUNGARY: Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.

ICELAND, *via* Denmark.

INDIA: India Store Department, India Office, London.

ITALY: Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.

JAMAICA: Institute of Jamaica, Kingston.

JAPAN: Imperial Library of Japan, Tokyo.

JAVA, *via* Netherlands.

KOREA: His Imperial Japanese Majesty's Residency-General, Seoul.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

LIBERIA: Bureau of Exchanges, Department of State, Monrovia.
LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
LUXEMBURG, *via* Germany.
MADAGASCAR, *via* France.
MADEIRA, *via* Portugal.
MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
MOZAMBIQUE, *via* Portugal.
NETHERLANDS: Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.
NEW GUINEA, *via* Netherlands.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
NEW ZEALAND: Dominion Museum, Wellington.
NICARAGUA: Ministerio de Relaciones Exteriores, Managua.
NORWAY: Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
PANAMA: Secretaría de Relaciones Exteriores, Panama.
PARAGUAY: Ministerio de Relaciones Exteriores, Asuncion.
PERSIA: Board of Foreign Missions of the Presbyterian Church, New York City.
PERU: Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
PORTUGAL: Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
QUEENSLAND: Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.
ROUMANIA: Academia Romana, Bucharest.
RUSSIA: Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
SERBIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
SIAM: Department of Foreign Affairs, Bangkok.
SOUTH AUSTRALIA: Public Library of South Australia, Adelaide.
SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SUMATRA, *via* Netherlands.
SWEDEN: Kongliga Svenska Vetenskaps Akademien, Stockholm.
SWITZERLAND: Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.
SYRIA: Board of Foreign Missions of the Presbyterian Church, New York.
TASMANIA: Secretary to the Premier, Hobart.
TRINIDAD: Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.
TUNIS, *via* France.
TURKEY: American Board of Commissioners for Foreign Missions, Boston.
UNION OF SOUTH AFRICA: Government Printing Works, Pretoria, Transvaal.
URUGUAY: Oficina de Canje Internacional, Montevideo.
VENEZUELA: Biblioteca Nacional, Caracas.
VICTORIA: Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
WINDWARD AND LEEWARD ISLANDS: Imperial Department of Agriculture, Bridgetown, Barbados.

Respectfully submitted.

F. W. TRUE,
*Assistant Secretary in Charge
 of Library and Exchanges.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

SEPTEMBER 27, 1913.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report of the operations of the National Zoological Park for the fiscal year ending June 30, 1913.

The general appropriation made by Congress for the improvement and maintenance during that year was \$100,000. The cost of food for the animals was \$20,235, which is somewhat less than during the previous year, being due to the decline in prices of forage from the extremely high rates which then prevailed. The expenditures for upkeep were greater than usual, especially as to out-door cages, inclosures, and fences.

ACCESSIONS.

During the previous year, owing to the necessity of providing a fireproof building for the central heating plant and making certain urgently needed small improvements, only a small sum was used for the purchase of animals. During the present year several important animals have been added, including a pair of young African elephants, three dromedaries, a pair of cheetahs, several species of gazelles, and other animals, purchased from the Government Zoological Garden at Giza, Egypt. These were engaged some time before the end of the fiscal year, but, as explained below, they did not finally reach the park until a little after the end of the period covered by this report.

Seven ostriches from southern California were purchased, and two moose, a male and a female, were obtained by exchange from the Rocky Mountains National Park in Alberta, Canada. The accessions, with the animals from Giza, included 15 species not previously represented in the collection.

The total amount expended for purchase and transportation of animals was \$6,900.

Mammals and birds born and hatched in the park numbered 78 and included polar, grizzly, and Alaskan brown bears, alpaca, llama, American tapir, chamois, harnessed antelope, deer of several species, with some other mammals and various birds.

EXCHANGES.

The number of exchanges was smaller than usual. As already mentioned, two moose were received from the Rocky Mountains National Park and several animals from dealers.

ANIMALS FROM GIZA.

In the latter part of March, 1913, an offer of some desirable animals was received from the Government Zoological Garden at Giza, Egypt. This offer included two young African elephants, a male and a female, and a number of other less important animals. The two elephants were engaged for the park, together with three dromedaries and two Arabian baboons. As the Egyptian authorities required the animals to be accepted at their gardens, it was thought advisable to send the head keeper of the park to receive them and accompany them during transportation. He left Washington May 15, 1912, and arrived at Giza on June 19. On his arrival he found that several other desirable animals were available there and was authorized by cable to secure them for the park, so that there were altogether 21 animals in the shipment. It was necessary to go to London to arrange for transportation, and on the way from there to Egypt the zoological gardens at Amsterdam, Rotterdam, Antwerp, Cologne, and Rome were visited.

ANIMALS IN THE COLLECTION JUNE 30, 1913.

MAMMALS.

Grivet monkey (<i>Cercoopithecus sabaeus</i>)	1	Polar bear (<i>Thalarctos maritimus</i>)	2
Green monkey (<i>Cercoopithecus callitrichus</i>)	1	European brown bear (<i>Ursus arctos</i>)	2
Mona monkey (<i>Cercoopithecus mona</i>)	2	Kadiak bear (<i>Ursus middendorffi</i>)	1
Diana monkey (<i>Cercoopithecus diana</i>)	1	Yakutat bear (<i>Ursus dalli</i>)	1
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	1	Alaskan brown bear (<i>Ursus gyas</i>)	3
Bonnet monkey (<i>Macacus sinicus</i>)	2	Hybrid bear (<i>Ursus gyas-arctos</i>)	1
Macaque monkey (<i>Macacus cynomolgus</i>)	2	Kidder's bear (<i>Ursus kidderi</i>)	2
Pig-tailed monkey (<i>Macacus nemestrinus</i>)	1	Himalayan bear (<i>Ursus thibetanus</i>)	1
Rhesus monkey (<i>Macacus rhesus</i>)	3	Grizzly bear (<i>Ursus horribilis</i>)	3
Brown macaque (<i>Macacus arctoides</i>)	4	Black bear (<i>Ursus americanus</i>)	9
Japanese monkey (<i>Macacus fuscatus</i>)	16	Cinnamon bear (<i>Ursus americanus</i>)	2
Moor monkey (<i>Macacus maurus</i>)	3	Malay bear (<i>Ursus malayanus</i>)	2
Black ape (<i>Cynopithecus niger</i>)	1	Sloth bear (<i>Melursus ursinus</i>)	1
Chacma (<i>Papio porcarius</i>)	1	Kinkajou (<i>Cerooleptes caudivolvulus</i>)	1
Hamadryas baboon (<i>Papio hamadryas</i>)	1	Cacomistle (<i>Bassariscus astuta</i>)	1
Mandrill (<i>Papio matmon</i>)	3	Gray coatimundi (<i>Nasua narica</i>)	5
Gray spider monkey (<i>Ateles geoffroyi</i>)	1	Raccoon (<i>Procyon lotor</i>)	19
White-throated capuchin (<i>Cebus hypoleucus</i>)	1	American badger (<i>Taxidea taxus</i>)	2
Brown monkey (<i>Cebus fatuellus</i>)	1	Common skunk (<i>Mephitis putida</i>)	4
Durukull (<i>Nyctipithecus trivirgatus</i>)	2	American marten (<i>Mustela americana</i>)	2
Ruffed lemur (<i>Lemur varius</i>)	2	Fisher (<i>Mustela pennantii</i>)	1
Ring-tailed lemur (<i>Lemur catta</i>)	3	Mink (<i>Putorius vison</i>)	5
		Common ferret (<i>Putorius putorius</i>)	1
		Black-footed ferret (<i>Putorius nigripes</i>)	2
		North American otter (<i>Lutra canadensis</i>)	5
		Eskimo dog (<i>Canis familiaris</i>)	2

Dingo (<i>Canis dingo</i>)	2	Indian elephant (<i>Elephas maximus</i>)	2
Gray wolf (<i>Canis occidentalis</i>)	4	Brazilian tapir (<i>Tapirus americanus</i>)	5
Black wolf (<i>Canis occidentalis</i>)	1	Grevy's zebra (<i>Equus grevyi</i>)	1
Coyote (<i>Canis latrans</i>)	8	Zebra-donkey hybrid (<i>Equus grevyi</i> <i>asinus</i>)	1
Woodhouse's coyote (<i>Canis frustror</i>)	8	Grant's zebra (<i>Equus burchelli granti</i>)	1
Red fox (<i>Vulpes pennsylvanicus</i>)	4	Collared peccary (<i>Dicotyles angulatus</i>)	1
Swift fox (<i>Vulpes velox</i>)	2	Wild boar (<i>Sus scrofa</i>)	1
Arctic fox (<i>Vulpes lagopus</i>)	2	Northern wart hog (<i>Phacochærus afri-</i> <i>canus</i>)	2
Gray fox (<i>Urocyon cinereo-argenteus</i>)	5	Hippopotamus (<i>Hippopotamus am-</i> <i>phibius</i>)	1
Spotted hyena (<i>Hyæna orocuta</i>)	1	Guanaco (<i>Lama huanchus</i>)	2
African palm civet (<i>Viverra civetta</i>)	1	Llama (<i>Lama glama</i>)	10
Common genet (<i>Genetta genetta</i>)	2	Alpaca (<i>Lama pacos</i>)	1
Sudan lion (<i>Felis leo</i>)	2	Vicugna (<i>Lama vicugna</i>)	1
Kilimanjaro lion (<i>Felis leo sababienis</i>)	4	Bactrian camel (<i>Camelus bactrianus</i>)	2
Tiger (<i>Felis tigris</i>)	1	Muntjac (<i>Cervulus muntjac</i>)	2
Cougar (<i>Felis oregonensis hippolestes</i>)	8	Sambar deer (<i>Cervus aristoteli</i>)	2
Jaguar (<i>Felis onca</i>)	1	Philippine deer (<i>Cervus philippinus</i>)	1
Leopard (<i>Felis pardus</i>)	2	Hog deer (<i>Cervus porcinus</i>)	5
Black leopard (<i>Felis pardus</i>)	1	Barasingha deer (<i>Cervus duvaucoli</i>)	12
Serval (<i>Felis serval</i>)	1	Axis deer (<i>Cervus axis</i>)	4
Ocelot (<i>Felis pardalis</i>)	1	Japanese deer (<i>Cervus sika</i>)	14
Canada lynx (<i>Lynx canadensis</i>)	1	Red deer (<i>Cervus elaphus</i>)	7
Bay lynx (<i>Lynx rufus</i>)	6	American elk (<i>Cervus canadensis</i>)	6
Spotted lynx (<i>Lynx rufus texensis</i>)	2	Fallow deer (<i>Cervus dama</i>)	7
Florida lynx (<i>Lynx rufus floridanus</i>)	1	Moose (<i>Alces americanus</i>)	1
Steiner's sea lion (<i>Eumetopias steelleri</i>)	1	Virginia deer (<i>Odocoileus virginianus</i>)	12
California sea lion (<i>Zalophus californi-</i> <i>anus</i>)	2	Mule deer (<i>Odocoileus hemionus</i>)	15
Northern fur seal (<i>Callotaria alascan</i>)	1	Columbian black-tailed deer (<i>Odocoi-</i> <i>leus columbianus</i>)	1
Harbor seal (<i>Phoca vitulina</i>)	2	Cuban deer (<i>Odocoileus sp.</i>)	1
Fox squirrel (<i>Sciurus niger</i>)	9	Coke's hartebeest (<i>Budalis cokei</i>)	1
Western fox squirrel (<i>Sciurus ludovi-</i> <i>cianus</i>)	8	Blessbok (<i>Damaliscus albidifrons</i>)	1
Gray squirrel (<i>Sciurus carolinensis</i>)	40	White-tailed gnu (<i>Connochætes gnu</i>)	1
Black squirrel (<i>Sciurus carolinensis</i>)	20	Defassa water buck (<i>Cobus defassa</i>)	1
Albino squirrel (<i>Sciurus carolinensis</i>)	1	Indian antelope (<i>Antilope cervicapra</i>)	28
Panama squirrel	1	Nilgai (<i>Boselaphus tragocamelus</i>)	2
Prairie dog (<i>Cynomys ludovicianus</i>)	28	Congo harnessed antelope (<i>Trage-</i> <i>laphus gratus</i>)	2
Woodchuck (<i>Arctomys monax</i>)	8	Chamois (<i>Rupicapra tragus</i>)	3
Albino woodchuck (<i>Arctomys monax</i>)	1	Tahr (<i>Hemitragus jemalicus</i>)	6
Black woodchuck (<i>Arctomys monax</i>)	1	Common goat (<i>Capra hircus</i>)	4
Alpine marmot (<i>Arctomys marmotta</i>)	2	Angora goat (<i>Capra hircus</i>)	3
American beaver (<i>Castor canadensis</i>)	2	Barbary sheep (<i>Ovis tragelaphus</i>)	13
Coyu (<i>Myocastor coypus</i>)	1	Barbados sheep (<i>Ovis aries-trage-</i> <i>laphus</i>)	13
Hutia-conga (<i>Capromys pilorides</i>)	2	Anoa (<i>Anoa depressicornis</i>)	1
Indian porcupine (<i>Hystrix leucura</i>)	2	East African buffalo (<i>Buffelus neu-</i> <i>manni</i>)	1
Canada porcupine (<i>Erethizon dorsa-</i> <i>tus</i>)	1	Zebu (<i>Bibos indicus</i>)	3
Canada porcupine (<i>Erethizon dorsatus</i>)	1	Yak (<i>Posphagus grunniens</i>)	5
albino	1	American bison (<i>Bison americanus</i>)	13
Western porcupine (<i>Erethizon epiam-</i> <i>thus</i>)	1	Hairy armadillo (<i>Dasypus villosus</i>)	3
Mexican agouti (<i>Dasypsecta mexi-</i> <i>cana</i>)	1	Wallaroo (<i>Macropus robustus</i>)	3
Azara's agouti (<i>Dasypsecta azara</i>)	2	Red kangaroo (<i>Macropus rufus</i>)	3
Crested agouti (<i>Dasypsecta oristata</i>)	2	Bennett's wallaby (<i>Macropus ruficollis</i> <i>bennetti</i>)	1
Hairy-rumped agouti (<i>Dasypsecta prym-</i> <i>nolopha</i>)	4	Virginia opossum (<i>Didelphys marsupi-</i> <i>alis</i>)	2
Paca (<i>Calogenys paca</i>)	2	Virginia opossum (<i>Didelphys marsupi-</i> <i>alis</i>) albino	1
Guinea pig (<i>Cavia cutleri</i>)	13	Common wombat (<i>Phascogomys mitch-</i> <i>elli</i>)	1
Patagonian cavy (<i>Dolichotis pata-</i> <i>gonica</i>)	3		
Capybara (<i>Hydrochærus capybara</i>)	1		
Domestic rabbit (<i>Lepus cuniculus</i>)	37		
Cape hyrax (<i>Procavia capensis</i>)	1		

BIRDS.

European blackbird (<i>Merula merula</i>)	1	Yellow tyrant (<i>Pitangus derbianus</i>)	2
Mocking bird (<i>Mimus polyglottos</i>)	1	Giant kingfisher (<i>Dacelo gigas</i>)	1
Catbird (<i>Dumetella carolinensis</i>)	1	Yellow-breasted toucan (<i>Rhamphastos carinatus</i>)	3
Brown thrasher (<i>Toxostoma rufus</i>)	1	Sulphur-crested cockatoo (<i>Cacatua galerita</i>)	3
Japanese robin (<i>Liothris luteus</i>)	10	White cockatoo (<i>Cacatua alba</i>)	6
White-cheeked bulbul (<i>Pycnonotus leucogenys</i>)	1	Leadbeater's cockatoo (<i>Cacatua leadbeateri</i>)	1
Black bulbul (<i>Pycnonotus pygæus</i>)	1	Bare-eyed cockatoo (<i>Cacatua gymnops</i>)	4
Laughing thrush (<i>Garrulus leucolophus</i>)	2	Roseate cockatoo (<i>Cacatua roseicapilla</i>)	12
Bishop finch (<i>Tanagra episcopus</i>)	4	Gang-gang cockatoo (<i>Callocephalon falcinellum</i>)	1
Orange-cheeked waxbill (<i>Estrelda melopoda</i>)	7	Yellow and blue macaw (<i>Ara ararauna</i>)	2
Cordon-bleu (<i>Estrelda phainicotis</i>)	8	Red and yellow and blue macaw (<i>Ara macao</i>)	9
Magpie finch (<i>Spermestes fringilloides</i>)	2	Red and blue macaw (<i>Ara chloroptera</i>)	2
Cut-throat finch (<i>Amadina fasciata</i>)	10	Great green macaw (<i>Ara militaris</i>)	1
Zebra finch (<i>Amadina castaneotis</i>)	4	Mexican conure (<i>Conurus holochlorus</i>)	1
Black-headed finch (<i>Munia atricapilla</i>)	7	Carolina parakeet (<i>Conuropsis carolinensis</i>)	1
Three-colored finch (<i>Munia malacca</i>)	6	Cuban parrot (<i>Amazona leucocephala</i>)	2
White-headed finch (<i>Munia maja</i>)	9	Orange-winged amazon (<i>Amazona amazonica</i>)	2
Nutmeg finch (<i>Munia punctularia</i>)	6	Porto Rican amazon (<i>Amazona vittata</i>)	1
Java sparrow (<i>Munia oryzivora</i>)	13	Yellow-shouldered amazon (<i>Amazona ochropus</i>)	2
White Java sparrow (<i>Munia oryzivora</i>)	12	Yellow-fronted amazon (<i>Amazona ochrocephala</i>)	2
Sharp-tailed grass finch (<i>Poëphila acutirostris</i>)	2	Red-fronted amazon (<i>Amazona rhodocorytha</i>)	1
Silver-bill finch (<i>Aidemosyne cantans</i>)	12	Yellow-headed amazon (<i>Amazona leucostictus</i>)	2
Chestnut-breasted finch (<i>Donacolia castaneothorax</i>)	6	Blue-fronted amazon (<i>Amazona aestiva</i>)	2
Bearded finch (<i>Spermophila</i> sp.)	2	Lesser vasa parrot (<i>Coracopsis nigra</i>)	2
Napoleon weaver (<i>Pyromelana afra</i>)	4	Banded parakeet (<i>Palæornis fasciata</i>)	1
Madagascar weaver (<i>Foudia madagascariensis</i>)	4	Alexandrine parakeet (<i>Palæornis alexandri</i>)	4
Red-billed weaver (<i>Quelea quelea</i>)	8	Rosella parakeet (<i>Platycercus eximius</i>)	2
Whydah weaver (<i>Vidua paradisica</i>)	28	Love bird (<i>Agapornis pullaria</i>)	2
Painted bunting (<i>Passerina ciris</i>)	1	Green parakeet (<i>Loriculus</i> sp.)	2
Red-crested cardinal (<i>Paroaria cucullata</i>)	8	Shell parakeet (<i>Melospittacus undulatus</i>)	9
Rose-breasted grosbeak (<i>Zamelodia ludriciana</i>)	1	Great horned owl (<i>Bubo virginianus</i>)	8
Common cardinal (<i>Cardinalis cardinalis</i>)	1	Arctic horned owl (<i>Bubo virginianus subarcticus</i>)	1
Siskin (<i>Spinus spinus</i>)	5	Screech owl (<i>Otus asio</i>)	4
Saffron finch (<i>Sycalis flaveola</i>)	19	Barred owl (<i>Strix varia</i>)	3
European goldfinch (<i>Carduelis elegans</i>)	2	Barn owl (<i>Aluco pratincola</i>)	8
Yellow-hammer (<i>Emberiza citrinella</i>)	1	Sparrow hawk (<i>Falco sparverius</i>)	1
Common canary (<i>Serinus canarius</i>)	28	Bald eagle (<i>Haliaeetus leucocephalus</i>)	12
Linnæ (<i>Linnaea cannabina</i>)	4	Alaskan bald eagle (<i>Haliaeetus leucocephalus alascanus</i>)	1
Bullfinch (<i>Pyrrhula citrinella</i>)	1	Golden eagle (<i>Aquila chrysaetos</i>)	2
Cowbird (<i>Molothrus ater</i>)	1	Harpy eagle (<i>Thrasaetus harpyia</i>)	1
Glossy starling (<i>Lamprolornis caudatus</i>)	1	Chillian eagle (<i>Geranoaetus melanoleucus</i>)	1
Malabar mynah (<i>Polyopsar malabaricus</i>)	1	Crowned hawk eagle (<i>Spizaetus coronatus</i>)	1
European raven (<i>Corvus corax</i>)	1	Red-shouldered hawk (<i>Buteo lineatus</i>)	1
American raven (<i>Corvus corax sinuatus</i>)	2		
Common crow (<i>Corvus brachyrhynchos</i>)	1		
Green jay (<i>Xanthoura leucosoma</i>)	1		
White-throated jay (<i>Garrulus leucotis</i>)	2		
Blue jay (<i>Cyanocitta cristata</i>)	3		
American magpie (<i>Pica pica hudsonica</i>)	2		
Red-billed magpie (<i>Urocissa occipitalis</i>)	2		
Piping crow (<i>Gymnorhina tibicen</i>)	2		

Venezuelan hawk.....	1	Little blue heron (<i>Florida cærulea</i>).....	1
Caracara (<i>Polyborus cheriway</i>).....	3	Reddish egret (<i>Dichromanassa rufes-</i>	
Lammergeyer (<i>Gypaëtus barbatus</i>).....	2	<i>cens</i>).....	1
South American condor (<i>Sarcorham-</i>		Snowy egret (<i>Egretta candidissima</i>).....	4
<i>phus gryphus</i>).....	2	Great white heron (<i>Herodias egretta</i>).....	1
California condor (<i>Gymnogyps califor-</i>		Great blue heron (<i>Ardea herodias</i>).....	3
<i>nianus</i>).....	3	Great black-crowned heron (<i>Ardea</i>	
Griffon vulture (<i>Gyps fulvus</i>).....	2	<i>coccy</i>).....	1
Cinereous vulture (<i>Vultur monachus</i>).....	2	Boat-bill (<i>Cancomora cochlearia</i>).....	2
Egyptian vulture (<i>Neophron percno-</i>		Black stork (<i>Ciconia nigra</i>).....	1
<i>terus</i>).....	1	Marabou stork (<i>Leptoptilus dubius</i>).....	1
Turkey vulture (<i>Cathartes aura</i>).....	4	Wood ibis (<i>Mycteria americana</i>).....	2
Black vulture (<i>Catharista urubí</i>).....	2	Sacred ibis (<i>Ibis aethiops</i>).....	4
King vulture (<i>Gypagus papa</i>).....	2	White ibis (<i>Guara alba</i>).....	21
Red-billed pigeon (<i>Columba flaviro-</i>		Roseate spoonbill (<i>Ajaaja ajaja</i>).....	1
<i>stris</i>).....	4	European flamingo (<i>Phaenicopterus an-</i>	
Mourning dove (<i>Zenaidura macroura</i>).....	8	<i>tiquorum</i>).....	3
Peaceful dove (<i>Geopelia tranquilla</i>).....	2	Crested screamer (<i>Chauna cristata</i>).....	2
Collared turtle dove (<i>Turtur risortus</i>).....	13	Whistling swan (<i>Olor columbianus</i>).....	5
Cape masked dove (<i>Oena capensis</i>).....	5	Mute swan (<i>Cygnus gibbus</i>).....	4
Victoria crowned pigeon (<i>Goura vic-</i>		Black swan (<i>Chenopsis atrata</i>).....	1
<i>toria</i>).....	1	Muscovy duck (<i>Cairina moschata</i>).....	1
Purplish guan (<i>Penelope purpurascens</i>).....	1	White muscovy duck (<i>Cairina mos-</i>	
Crested curassow (<i>Cras alector</i>).....	1	<i>chata</i>).....	2
Mexican curassow (<i>Cras globicera</i>).....	2	Wandering tree-duck (<i>Dendrocygna ar-</i>	
Daubenton's curassow (<i>Cras dauben-</i>		<i>owata</i>).....	7
<i>toni</i>).....	1	Fulvous tree-duck (<i>Dendrocygna bi-</i>	
Wild turkey (<i>Meleagris gallopavo sil-</i>		<i>color</i>).....	2
<i>vestris</i>).....	5	Brant (<i>Branta bernicla glaucoogastra</i>).....	1
Peafowl (<i>Pavo cristata</i>).....	60	Canada goose (<i>Branta canadensis</i>).....	7
Jungle fowl (<i>Gallus bankiva</i>).....	1	Hutchins's geese (<i>Branta canadensis</i>	
English pheasant (<i>Phasianus colchi-</i>		<i>hutchinsii</i>).....	3
<i>cus</i>).....	1	Lesser snow goose (<i>Chen hyperboreus</i>).....	2
Reeves's pheasant (<i>Phasianus reevesi</i>).....	1	Greater snow goose (<i>Chen hyperboreus</i>	
Golden pheasant (<i>Thaumalea picta</i>).....	1	<i>nicola</i>).....	1
Silver pheasant (<i>Euplocamus nycthe-</i>		American white-fronted goose (<i>Anser</i>	
<i>merus</i>).....	1	<i>albifrons gambeli</i>).....	3
European quail (<i>Coturnia communis</i>).....	1	Chinese goose (<i>Anser cygnoides</i>).....	3
Hungarian partridge (<i>Perdix perdix</i>).....	1	Scaup duck (<i>Marila marila</i>).....	5
Bobwhite (<i>Colinus virginianus</i>).....	3	Canvasback (<i>Marila valisneria</i>).....	1
Mountain quail (<i>Oreortyx picta</i>).....	2	Red-headed duck (<i>Marila americana</i>).....	2
Scaled quail (<i>Callipepla squamata</i>).....	2	Wood duck (<i>Aix sponsa</i>).....	8
California quail (<i>Lophortyx califor-</i>		Mandarin duck (<i>Dendroessa galierow-</i>	
<i>nica</i>).....	1	<i>lata</i>).....	5
Gambel's quail (<i>Lophortyx gambeli</i>).....	3	Pintail (<i>Drila acuta</i>).....	4
Massena quail (<i>Cyrtonyx montezumæ</i>).....	7	Shoveler duck (<i>Spatula clypeata</i>).....	1
Purple gallinule (<i>Porphyrio cærulea</i>).....	1	Black duck (<i>Anas rubripes</i>).....	1
Black-backed gallinule (<i>Porphyrio me-</i>		Mallard (<i>Anas platyrhynchos</i>).....	13
<i>lanotus</i>).....	2	American white pelican (<i>Pelecanus</i>	
Martinique gallinule (<i>Ionornis martini-</i>		<i>erythrorhynchos</i>).....	10
<i>cus</i>).....	1	European white pelican (<i>Pelecanus</i>	
Florida gallinule (<i>Gallinula galeata</i>).....	1	<i>onocrotalus</i>).....	1
American coot (<i>Fulca americana</i>).....	11	Roseate pelican (<i>Pelecanus roseus</i>).....	1
Flightless rail (<i>Ocydromus australis</i>).....	1	Brown pelican (<i>Pelecanus occidentalis</i>).....	5
Common carlama (<i>Carlama cristata</i>).....	1	Florida cormorant (<i>Phalacrocorax au-</i>	
Demoiselle crane (<i>Anthropoides virgo</i>).....	7	<i>ritus floridanus</i>).....	14
Crowned crane (<i>Balearica pavonina</i>).....	2	Mexican cormorant (<i>Phalacrocorax</i>	
Sandhill crane (<i>Grus mexicana</i>).....	2	<i>vigua mexicanus</i>).....	1
Australian crane (<i>Grus australasiana</i>).....	1	Water turkey (<i>Anhinga anhinga</i>).....	5
European crane (<i>Grus cinerea</i>).....	2	Roseate tern (<i>Sterna dougalli</i>).....	3
Sarus crane (<i>Grus antigone</i>).....	1	Royal tern (<i>Sterna maxima</i>).....	4
Indian white crane (<i>Grus leucoge-</i>		Black-backed gull (<i>Larus marinus</i>).....	1
<i>ranus</i>).....	2	Herring gull (<i>Larus argentatus</i>).....	4
Ruff (<i>Machetes pugnax</i>).....	2	American herring gull (<i>Larus argen-</i>	
Black-crowned night heron (<i>Nycticorax</i>		<i>tatus smithsonianus</i>).....	5
<i>nycticorax naevius</i>).....	8	Laughing gull (<i>Larus atricilla</i>).....	2

South African ostrich (<i>Struthio australis</i>)-----	7	Common cassowary (<i>Casuarus galeatus</i>)-----	1
Somali ostrich (<i>Struthio molybdophanes</i>)-----	1	Common rhea (<i>Rhea americana</i>)-----	3
		Emu (<i>Dromæus novæ hollandiæ</i>)-----	1

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)--	17	Spreading adder (<i>Heterodon platyrhinus</i>)-----	1
Sharp-nosed crocodile (<i>Crocodilus americanus</i>)-----	1	Black snake (<i>Zamenis constrictor</i>)-----	3
Painted turtle (<i>Chrysemys picta</i>)-----	4	Coach-whip snake (<i>Zamenis flagellum</i>)-----	1
Diamond-back terrapin (<i>Malacoclemys palustris</i>)-----	1	Corn snake (<i>Coluber guttatus</i>)-----	1
Three-toed box-tortoise (<i>Cistudo tringuis</i>)-----	6	Common chicken snake (<i>Coluber quadrivittatus</i>)-----	1
Painted box-tortoise (<i>Cistudo ornata</i>)-----	5	Gopher snake (<i>Compsosoma corais couperi</i>)-----	1
Gopher turtle (<i>Xerobates polyphemus</i>)-----	1	Pine snake (<i>Pityophis melanoleucus</i>)-----	4
Duncan Island tortoise (<i>Testudo ephippium</i>)-----	2	Bull snake (<i>Pityophis sayi</i>)-----	1
Albemarle Island tortoise (<i>Testudoolina</i>)-----	1	King snake (<i>Ophibolus getulus</i>)-----	1
Horned lizard (<i>Phrynosoma cornutum</i>)-----	3	Common garter snake (<i>Eutania sirtalis</i>)-----	1
Gila monster (<i>Holodermis suspectum</i>)-----	5	Texas water snake (<i>Eutania proxima</i>)-----	1
Glass snake (<i>Ophisaurus ventralis</i>)-----	1	Water moccasin (<i>Ancistron plicatorius</i>)-----	1
Regal python (<i>Python reticulatus</i>)-----	1	Copperhead (<i>Ancistron contortrix</i>)-----	2
Anaconda (<i>Eunectes murinus</i>)-----	2	Diamond rattlesnake (<i>Crotalus adamanteus</i>)-----	3
Velvet snake (<i>Epicrates cenchris</i>)-----	1	Banded rattlesnake (<i>Crotalus horridus</i>)-----	1
Cuban tree-boas (<i>Epicrates angulifer</i>)-----	1		

GIFTS.

Mr. Raymond Adams, Washington, D. C., an alligator.
 Dr. J. S. Billupp, Leeland, Md., an American maple.
 Mr. M. E. Boyd, Washington, D. C., a horned lizard.
 Mr. August Busck, Washington, D. C., two marmosettes.
 Mr. W. M. Chrissinger, Hagerstown, Md., a black snake.
 Mrs. Eugenia S. Cleary, Washington, D. C., a common canary.
 Mr. Wallace Evans, Oak Park, Ill., four mink.
 Capt. W. E. P. French, Washington, D. C., an alligator.
 Mr. F. P. Hall, Washington, D. C., three alligators.
 Mr. Kidwell, Washington, D. C., a bald eagle.
 Mr. M. S. Lawrence, Washington, D. C., a common opossum.
 Mr. De Witt T. Leach, Washington, D. C., a woodchuck.
 Mr. Ralph W. Lee, Washington, D. C., an alligator.
 Miss Clare and Mr. James McCall, Mapleton, Pa., a banded rattlesnake.
 Mr. D. McLanahan, Washington, D. C., a barred owl.
 Mr. E. B. McLean, Washington, D. C., a skunk, two raccoons, and a toucan.
 Mr. J. W. Mills, Washington, D. C., an alligator.
 Mr. Victor Mindeleff, Washington, D. C., a crocodile.
 Mr. Thomas Moreland, Washington, D. C., a barn owl.
 Hon. L. P. Padgett, Columbia, Tenn., a gray coatimundi.
 Capt. A. W. Perry, Washington, D. C., a western mocking bird.
 Capt. R. B. Putnam, Washington, D. C., a gray coatimundi.
 Mr. F. J. Raymond, Washington, D. C., a green parrot.
 Dr. C. W. Richmond, Washington, D. C., two barn owls.
 Mrs. Ricketson, Washington, D. C., a common raccoon.
 Mr. Richard A. Sargent, Washington, D. C., a common canary.
 Mrs. Gurnon P. Scott, Washington, D. C., a shell parakeet.
 Mr. E. T. Seton, Cos Cob, Conn., three common skunks.
 Mr. Ellis Spear, Washington, D. C., two common canaries.
 Miss Straub, Washington, D. C., a green parrot.

Mr. H. E. Thomas, Washington, D. C., a black snake.

Mrs. E. St. Clair Thompson, Washington, D. C., a common canary.

Mrs. C. V. Williams, Washington, D. C., an alligator.

Hon. Woodrow Wilson, Washington, D. C., a horned lizard.

The Zoological Society of Philadelphia, six muskrats.

Unknown donors, a screech owl, five barn owls, an English pheasant, and an alligator.

LOSSES OF ANIMALS.

The most serious loss was among the ruminants. An eland, a bontebok, a Coke's hartebeest, and a harnessed antelope died from tuberculosis; a moose and a reindeer from enteritis; two tahr goats from pneumonia; and an American bison, 21 years old, from arteriosclerosis. A fur seal also died from enteritis and a grizzly bear that when captured, 19 years before, weighed 730 pounds was killed because of its general decrepitude. A number of birds were lost through the depredations of raccoons and other animals living at large in the park. The night herons had increased to such an extent in the flying cage that they interfered with the nesting of other birds there, and the greater part of them (114) were disposed of, a few as gifts to other zoological collections.

Of animals that died in the park, 107 were transferred to the National Museum. Autopsies were made as heretofore by the Pathological Division of the Bureau of Animal Industry, Department of Agriculture.¹

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented	66
Purchased	162
Born and hatched in National Zoological Park	78
Received in exchange	18
Deposited in National Zoological Park	6
Captured in National Zoological Park	1
Total	331

SUMMARY.

Animals on hand July 1, 1912	1,551
Accessions during the year	331
Total	1,882
Deduct loss (by exchange, death, return of animals, etc.)	414
On hand June 30, 1913	1,468

¹ The causes of death were reported to be as follows: Enteritis, 37; gastritis, 1; impaction of bowel, 3; pneumonia, 14; tuberculosis, 10; congestion of lungs, 4; aspergillosis, 4; malignant catarrh of nose and throat, 1; inflammation of pharynx and larynx, 1; congestion of liver, 1; septicemia, 3; sarcoma, 1; abscess, 1; gangrene of thyroid gland, 1; generalized fat necrosis, 1; arteriosclerosis, 1; umbilical infection, 1; starvation (snakes), 3; killed because of arthritis, 1, and of senile debility, 1; accidents (killed by animals, etc.), 32; no cause found (only viscera examined in most cases), 12.

Class.	Species.	Individuals.
Mammals.....	154	606
Birds.....	202	786
Reptiles.....	31	76
Total.....	387	1,468

VISITORS.

The number of visitors to the park during the year, as determined by count and estimate, was 633,526, a daily average of 1,731. This was nearly 100,000 more than during the fiscal year 1912. The largest number in any one month was 120,908, in March, 1913, an average per day of 3,900.

During the year 142 classes, schools, etc., with a total of 5,579 pupils, visited the park, a monthly average of 465. These were mainly from the District of Columbia and neighboring States, but other States, from Vermont, New Hampshire, and Massachusetts, to Tennessee and South Carolina, were represented, and "Corn Growers" belonging to 18 States.

IMPROVEMENTS.

The construction of a house for the storage and preparation of food, which was begun toward the close of the previous year, was completed early in this year and equipped with a large range for cooking and baking, a small cold-storage room, dumb-waiter, etc. The total cost of building and equipment was \$3,615, of which \$3,050 was paid from this year's appropriation. The building is of stone, 24 feet wide and 40 feet long, and has one story and a basement, both with concrete floors. It is abundantly lighted and thoroughly sanitary. It is located at the rear of the temporary bird house, so that the building and the yard about it are screened from public view, while still convenient of access. This improvement had been much needed, as the only place previously available for the preparation of food was the cellar of the lion house, where both light and ventilation were far from satisfactory.

An inclosure and shelter house were built between the lion house and the small-mammal house to afford temporary quarters for the small flock of ostriches recently acquired. The house is 16 feet wide and 24 feet long, and the adjoining inclosure, which is nearly circular, is about 100 feet in diameter.

A new inclosure, with a pool, for wood ducks and nearly related species, was built in the valley near the flying cage.

The suspension footbridge across Rock Creek near the northern entrance to the park having become unsafe, a new bridge of similar construction was built there.

A bridle path was laid out near the bank of the creek throughout its entire length in the park, and a rustic walk, mainly parallel to the roadway, was built from the concrete bridge to the north entrance.

Early in the year the first section of a retaining wall was built in the ravine opposite the point at which Ontario Road reaches the park, and later a second section was built above this, giving the wall a total height of 18 feet.

A small retaining wall was built, also, at the mouth of the little run at the northern edge of the park near Klinge Road to prevent further erosion there and protect valuable forest trees which are being undermined.

A small amount of riprapping was done at three places on the banks of the creek.

Just before the close of the year work was begun on the old elephant barn to fit it and the adjoining yard, then occupied by tapirs, for the temporary accommodation of the two young African elephants which had been secured from the zoological garden at Giza. A new yard, with a pool, for the tapirs was built next to the new elephant house, the work on this being well under way at the close of the year.

The cost of these improvements was as follows:

Food house (from 1913 appropriation)	\$3,050
Inclosure and shelter for ostriches	450
Inclosure and pool for wood ducks	200
New suspension footbridge	400
Bridle path and rustic walk	775
Retaining wall at Ontario Road	425
Retaining wall near Klinge Road	175
Riprapping banks of creek	275
Alterations of old elephant barn and inclosure	850
Total	\$6,000

Through the generosity of Mr. John B. Henderson, jr., there was completed in the autumn of 1912 an outdoor cage for parrots which had heretofore been confined in the bird house. The cage is 24 by 40 feet, and about 26 feet high, has a steel framework and is covered with strong wire netting of special construction. Several species of cockatoos and macaws, and one species of Amazon parrot, in all 28 specimens, were placed in the cage, and, with few exceptions, have been thrifty and appear to enjoy their outdoor freedom.

MAINTENANCE OF BUILDINGS, INCLOSURES, ETC.

It was necessary to make quite extensive repairs during the year, so that the expenditures for upkeep were somewhat larger than usual. New concrete floors were laid in two of the largest bear yards, and the pools rebuilt. The concrete base of the partitions between the

several yards was also built up sufficiently to bring the metal work of the partitions above the damp floor.

A section of the boundary fence of the park was largely rebuilt and other portions repaired, and much of the metal work of cages and inclosures was repainted, including the flying cage and eagle cage, bear yards, antelope yards, and the outside cages of the small-mammal house.

NEW BRIDGE ACROSS ROCK CREEK.

The sundry civil act for the fiscal year ending June 30, 1913, contained the following item: "For the construction of a rough-stone faced or boulder bridge across Rock Creek to replace the present log bridge on the line of the roadway from Adams Mill Road entrance and Cathedral Avenue, \$20,000." The act also includes the following provisions: "Hereafter all plans and specifications for the construction of buildings in the National Zoological Park shall be prepared under the supervision of the municipal architect of the District of Columbia, and all plans and specifications for bridges in said park shall be prepared under the supervision of the engineer of bridges of the District of Columbia."

In accordance with this requirement the matter of preparing plans and specifications for the bridge was taken up with the engineer of bridges very soon after the sundry civil act was approved (August 24, 1912). A considerable amount of preliminary work had already been done when the engineer of bridges died. The matter was taken up again with his successor and plans and specifications were prepared and advertisements made for proposals April 28, 1913. A contract for the construction of the bridge was entered into May 29, 1913. The old bridge was removed as soon as possible, and work on the new bridge was begun about the middle of June. The bridge is to be of reinforced concrete, faced with rough blocks of the blue gneiss found in this region. Stone for the concrete is to be obtained in the park. The span of the bridge is to be 80 feet and the total length at the road level 114 feet. The bridge will be 39 feet 6 inches wide from outside to outside, with a width of 36 feet 6 inches between the parapets. There will be a macadam roadway with concrete sidewalk on either side, but the construction of roadway and sidewalks will be deferred until the earth fill has thoroughly settled. The work on the main portion of the bridge covered by the contract will amount to about \$10,800, while the cost of material furnished by the park, preparation of plans, superintendence, and other expenses will probably bring the total cost up to \$15,300. The appropriation, therefore, will be sufficient to add wing walls if desirable, and to complete the approaches. It is expected that all work under the contract will be

finished and the temporary roadway built in time to open the bridge for use by October 30. It has been necessary to close the road to vehicles during the construction of the bridge.

Most of the members of the old log bridge, which was erected in 1896, were found to be in surprisingly good condition, but it was so much decayed at some vital points as to be dangerous for use.

ALTERATION OF THE WEST BOUNDARY OF THE PARK.

In the last annual report, as in several previous reports, attention was called to the urgent need of acquiring additional land along the western side of the park and the great desirability of extending the park to Connecticut Avenue. The matter was presented to Congress and an appropriation has been made for the purchase of the privately owned land lying between the western boundary of the park and Connecticut Avenue from Cathedral Avenue to Klinge Road, the land in the included highways also to become a part of the park. The land to be purchased amounts to about ten and two-thirds acres and that in the highways to about two and two-thirds acres.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution,

Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1913:

EQUIPMENT.

The equipment of the observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, Cal., upon a leased plot of ground 100 feet square, in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

During the year there was erected upon the observing shelter at Mount Wilson a tower 40 feet high above the 12-foot piers which had been prepared in the original construction of the building. This tower is now being equipped as a tower telescope for use when observing (with the spectroheliometer) the distribution of radiation over the sun's disk. The cost of the tower and its apparatus has thus far been about \$1,400.

Other pieces of apparatus for research have been purchased or constructed at the observatory shop. The value of these additions to the instrumental equipment, not counting the tower above mentioned and its equipment, is estimated at \$1,500.

WORK OF THE YEAR.

1. ON THE SOLAR CONSTANT OF RADIATION.

When Volume II of the Annals of the Astrophysical Observatory was published in 1908 the standard scale of measurement of solar radiation had not yet been established. Several supposedly standard pyrheliometers for the purpose of fixing the true scale of radiation

measurement were constructed and tried at this observatory, as mentioned in former reports. The results obtained agreed closely together and were checked by observations with known quantities of heat. In October, 1912, another type of standard pyrheliometer, which we called the water-stir pyrheliometer, was devised, constructed, and used. It proves to give values for the standard scale of radiation almost identical with those which we had before obtained, and in this instrument, as in the others, known test quantities of heat were introduced and measured within less than 1 per cent. In view of all these experiments with standard pyrheliometers, it is now felt that the standard scale of radiation is at length fully established. Accordingly, a publication entitled "Smithsonian Pyrheliometry Revised" was issued February 1, 1913, giving the results of all the definitive experiments on the standard scale of radiation and also the experiments made to fix the scales of all the secondary pyrheliometers in use at the Astrophysical Observatory or furnished by the Smithsonian Institution to observers in this country and abroad.

A small correction in the determinations of the solar constant of radiation made at Mount Wilson and elsewhere was found to be required owing to a residual effect of water vapor in the atmosphere which had not been entirely eliminated. This correction sometimes reaches as great a magnitude as 2 per cent. It has now been applied to all the measurements made at the various stations which have been occupied since 1902, and all the solar-constant measurements, about 700 in number, have been reduced to the new standard scale of pyrheliometry.

The mean value of the solar constant of radiation at the earth's mean distance from the sun from about 700 measurements, some at Washington, others at Mount Wilson, others at Bassour, Algeria, and still others at Mount Whitney, Cal., and covering the years from 1902 to 1912, has now been taken. *It is 1.932 calories per square centimeter per minute.*

2. THE VARIABILITY OF THE SUN.

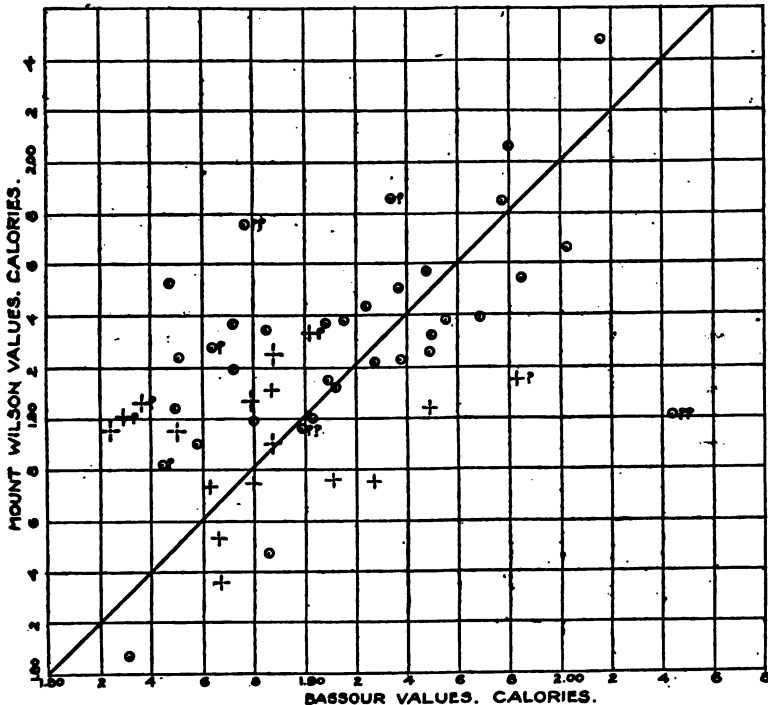
(a) *Attending sun spots.*

In connection with the reduction of the measurements of the solar constant of radiation mentioned above, mean values were taken for each month during which observations had been made at Mount Wilson. These monthly mean values, extending from the year 1905 to the year 1912, have been compared with the so-called Wolff sun-spot numbers for the same months. The result shows, as indicated in the accompanying illustration, that increased solar-constant values attend increased sun-spot numbers. An increase of radiation at the earth's mean distance from the sun of 0.07 calorie per square

centimeter per minute appears to attend an increased spottedness of the sun represented by 100 Wolff sun-spot numbers.

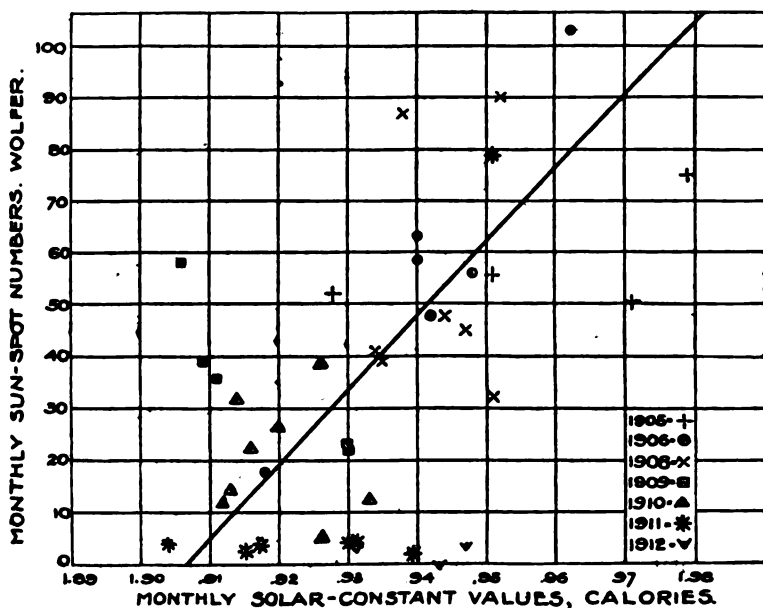
(b) *Short interval irregular variability.*

The observations which had been begun in the year 1911 and continued in the year 1912 at Bassour, Algeria, simultaneously with similar observations at Mount Wilson, Cal., were concluded in September, 1912. The observations obtained at the two stations have



now been completely reduced and compared. The results given in the accompanying diagram show conclusively that if high values of the solar radiation (outside the atmosphere) are found from California observations, the values found from Algerian observations will be high also, and vice versa. In other words, the fluctuation of the "solar-constant" values which had been found in California in former years are now shown to be no local phenomenon due, perhaps, to atmospheric disturbances, but rather a phenomenon which is general over the earth's surface and which must be attributed to causes outside the earth altogether. It would be conceivable that such a cause might be the interposition of meteoric dust or other matter between the earth and the sun; but other evidence, which is more fully explained in Volume III of the Annals of the Astro-

physical Observatory, shows that we must attribute the changes to the sun itself and not to the interposition of matter between the earth and the sun. Thus we may conclude that the sun is variable, having not only a periodicity connected with the periodicity of sun spots, but also an irregular, nonperiodic variation, sometimes running its course in a week or 10 days, at other times in longer periods, and ranging over irregular fluctuations of from 2 to 10 per cent of the total radiation in magnitude.



3. THE EFFECTS OF VOLCANIC ERUPTIONS.

Violent eruption of Mount Katmai, Alaska, occurred on June 6, 7, and 8, 1912. The solar observations made at Bassour, Algeria, and at Mount Wilson, Cal., began to indicate the presence of dust in the upper air from this volcano about June 20, 1912. The effects of this dust became more and more considerable, so that in August the direct radiation of the sun was reduced by the interposition of the dust cloud by about 20 per cent, both at Bassour and Mount Wilson. A study of the influence of Mount Katmai and other volcanic eruptions was published by Messrs. Abbot and Fowle in the Smithsonian Miscellaneous Collections, volume 60, No. 29, 1913. It was shown that not only the volcano of Mount Katmai, but also other great eruptions of former years, have materially decreased the direct radiation of the sun, and apparently altered the temperature of the earth. Various observers have shown that the presence of sun spots is attended with a decreased terrestrial temperature. In the paper just mentioned it is shown that quite as important an

influence is attributable to the presence of volcanic haze; and that a combination of the effects of sun spots and volcanic haze accounts for all the principal outstanding irregularities in the temperature of the earth for the last 30 years.

4. VOLUME III OF THE ANNALS OF THE ASTROPHYSICAL OBSERVATORY.

The principal work of the year was the reduction of observations and the preparation for publication of Volume III of the Annals of the Astrophysical Observatory. (Quarto; pp. XI+241; tables, 70; inserted plates, 7; text figures, 32.) The manuscript was forwarded to the Public Printer on April 1, and the first completed copy of the book was received on July 3, 1913. About 1,400 copies have been distributed to libraries and individuals throughout the world.

In brief, the experiments described therein, which include the work of the observatory from 1907 to 1913, appear—

(a) To have established the scale of measurement of radiation to within 1 per cent.

(b) To have established the solar constant of radiation to within 1 per cent.

(c) To have shown by two independent methods that the sun's emission is not uniform but varies with an irregular periodicity of from 7 to 10 days on the average and with irregular amounts seldom if ever exceeding 10 per cent.

(d) To have shown that the sun also varies in connection with the sun-spot cycle. The solar emission appears to be increased at the earth's mean distance from the sun by about 0.07 of a calorie per square centimeter per minute for an increase of 100 Wolff sun-spot numbers.

(e) A marked effect of volcanic dust in the upper atmosphere on the radiation of the sun and on the temperature of the earth is indicated.

(f) Studies of the radiation of the sky, the effects of water vapor on the solar radiation, the distribution of radiation over the sun's disk, the probable temperature of the sun, and other subjects are included.

5. STUDIES OF THE TRANSMISSION OF LONG WAVE RAYS BY WATER VAPOR IN THE EARTH'S ATMOSPHERE.

Mr. Fowle's experiments on the transmission of radiation through long columns of air containing measured quantities of water vapor were temporarily discontinued owing to the need of completing the publication of Volume III of the Annals. He, however, published a paper on the quantity of water vapor found above the Mount Wilson station.¹

Toward the end of the fiscal year a vacuum bolometer was prepared for use in continuing the experiments on the transmission of

¹ *Astrophysical Journal*, vol. 37, p. 359, 1913.

very long wave rays through atmospheric water vapor. It is proposed to push this work in the immediate future.

6. THE CALIFORNIA EXPEDITION.

A grant of money from the Hodgkins fund having been made by the Institution to Mr. A. K. Ångström for observations of nocturnal radiation at different altitudes, several other lines of investigation were arranged to be included in connection with these researches. In the first place measurements were proposed on the total radiation from the sky by day. For this purpose and with the aid of a small grant from the Hodgkins fund Mr. Abbot devised and tested a special sky-radiation apparatus. This instrument comprises two blackened strips of metal, which are exposed successively at the centers of two metal plates in such a way that the whole hemisphere of the sky is free to shine on the exposed blackened strip, but nothing can come from below the horizon toward the strips. Each strip is at the center of a hemispherical glass inclosure, which serves the purpose of preventing the exchange of rays of long-wave lengths (associated with the temperature of such objects) between the blackened strip and the sky. Thus the apparatus serves to measure the quantity of radiation, originally coming from the sun, which has become diffusely scattered toward the horizontal surface by the molecules and dust particles found in the atmosphere.

Secondly, in order to determine the temperature and humidity prevailing above the stations occupied by Mr. Ångström's expeditions, the Institution procured a large number of sounding balloons, and arrangements were made with the Weather Bureau for flying these balloons from Santa Catalina Island, carrying with each ascension self-recording apparatus of the Weather Bureau for measuring the temperature, pressure, and humidity of the air. Captive balloons belonging to the Weather Bureau were also arranged to be sent up at Lone Pine, Cal., and at Mount Whitney, Cal., while Mr. Ångström was occupying these two stations.

As certain writers have expressed doubt whether measurements of the solar constant of radiation made by Langley's method of high and low observations with the spectrobolometer really furnish the solar radiation values as they would be found outside our atmosphere, it seemed desirable to check these results by observing at the highest possible altitudes the actual intensity of the solar radiation. For this purpose Mr. Abbott designed a form of pyrliometer, similar in principle to the silver-disk pyrliometer, but which is automatic and self-recording, and can be attached to a sounding balloon, and thus carried to very great heights. Five copies of this instrument were prepared at the observatory shops by Mr.

Kramer and Mr. Abbot, and these were sent with the expedition to California. In anticipation it may be said that the five instruments were sent up on successive days, beginning July 30, 1913, and at the time of writing this report two of them have been recovered. Each of the two had a readable record of the ascension. A preliminary reduction of the results shows that, beginning at an altitude of about 6,000 meters and separated by altitude intervals of 2,000 or 3,000 meters for successive exposure, four determinations of the solar radiation were obtained in each of the ascents. The rough computation mentioned results as follows: First ascent: 1.44, 1.60, 1.70, and 1.88 calories per square centimeter per minute. Second ascent: 1.62, 1.64, 1.76, and 1.89 calories per square centimeter per minute.

These results are subject to later recomputation, but they indicate at least that our solar-constant work of 1902-1912 by high and low sun observations on homogeneous rays, according to Langley's methods, gives results of the same order of magnitude as those obtained by direct pyrheliometric observations at extremely high altitudes.

PERSONNEL

No change has occurred in the staff of the observatory, except that Miss F. E. Frisby completed her temporary service as computer on June 30, 1913, and Mr. A. K. Ångström served as temporary bolometric assistant in Algeria from July 1, 1912, to September 30, 1912.

SUMMARY.

The work of the observatory has been uncommonly successful. Volume III of its Annals has been published, including the work of the years 1907 to 1912. The observations at Bassour, Algeria, taken in connection with those made simultaneously at Mount Wilson, Cal., have established the variability of the sun. A variability connected with the sun-spot cycle has also been shown. The mean value of the solar constant of radiation has been fixed, it is thought, within 1 per cent. From about 700 observations, extending over the time interval from 1902 to 1912 and taken at different altitudes from sea level to 4,420 meters, the mean value is 1.932 calories per square centimeter per minute. Pyrheliometers have been sent up by means of sounding balloons to very great altitudes, and preliminary results indicate that they give values of the solar radiation similar to those found by high and low sun observations on homogeneous rays.

Respectfully submitted.

C. G. ABBOT,
*Director Astrophysical Observatory,
Smithsonian Institution.*

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to submit the following report on work performed for the Smithsonian Library during the fiscal year ending June 30, 1913:

ACCESSIONS.

The accessions to the library are obtained mainly by exchange of its own publications, or by gift. During the fiscal year 1913, 33,161 packages of publications were received as exchanges and gifts, of which 29,065 packages were transmitted by mail and 4,096 through the International Exchange Service. In addition to letters written in acknowledgement of publications received in response to the requests of the Institution for exchange, some 5,000 publications were acknowledged on the regular printed forms.

The following number of accessions for the Smithsonian deposit in the Library of Congress were recorded during the year: 3,379 volumes, 1,407 parts of volumes, 5,990 pamphlets, and 450 charts; total, 11,226 publications. The numbers in the accession catalogue ran from 508,789 to 513,026, the parts of serial publications entered on the card catalogue numbered 21,081,¹ and 1,256 slips were prepared for completed volumes. The various publications sent to the Library of Congress as soon as received and entered filled 257 boxes and comprised 30,350 separate pieces, including parts of periodicals, pamphlets and complete volumes. Besides these, about 1,704 parts of serials needed to complete sets were obtained by exchange and sent to the Library of Congress separately.

As in previous years, public documents presented to the Institution were sent to the Library of Congress without being stamped or recorded. Publications of this class to the number of 9,866 were transmitted in this manner during the year.

The Smithsonian Office Library and the small collections of books maintained by the Astrophysical Observatory and the National Zoological Park received accessions amounting altogether to 573, divided as follows: Smithsonian Office, 314 volumes, 37 parts of vol-

¹ Only a portion of these are included in the foregoing statistics of accessions, as periodicals are not entered in the accession record until volumes are complete.

umes, and 19 pamphlets; Astrophysical Observatory, 90 volumes, 21 parts of volumes, and 69 pamphlets; National Zoological Park, 13 volumes and 10 pamphlets.

EXCHANGES.

Through correspondence, 140 new periodicals were added during the year to the great collection of scientific journals contained in the Smithsonian deposit, together with 1,704 parts needed to complete volumes in the various series.

The matter of the completion of sets in the Smithsonian deposit received special attention. Revised want lists for Belgium, Denmark, France, Germany, the Netherlands, Norway, Sweden, and Switzerland were taken up, and, so far as possible, the needed parts were supplied. These lists were additional to the regular want cards received separately from the Library of Congress. As a result of the work carried on in this direction during the year, 192 parts of 60 different publications were sent to the Library of Congress to complete sets of periodicals in the Smithsonian deposit and 1,475 missing parts needed to complete volumes of 173 different series of publications of learned societies and scientific institutions. For other divisions of the Library of Congress 37 parts of 16 sets were supplied.

In exchange for annual reports of the American Historical Association a number of publications of European historical societies were obtained for the library, as in previous years.

READING ROOM.

The rearrangement of the reading room in the Smithsonian building mentioned in last year's report was completed. Two new oak tables have been provided, a large one for readers and a smaller one with bins for periodicals. All the doors have been removed from the cases of pigeonholes for periodicals which stand against the walls and proper space made for desks and aisles. By these changes the appearance of the room has been much improved and the periodicals made more readily accessible. The latest issues of about 262 domestic and foreign scientific periodicals are now constantly at hand and are consulted by the staff of the Institution and its branches, the scientific officers of various governmental establishments in Washington, and students generally. The series of large accession books formerly kept in the reading room have been removed to the adjoining office and placed in a special case. A partial rearrangement of the contents of the room farther to the east was effected during the year for the purpose of making the encyclopedias, dictionaries, gazetteers, and other books of general reference more readily accessible. This room contains the transactions of the vari-

ous academies of the world and other similar series which are constantly needed for reference by the scientific staff of the Institution.

AERONAUTICAL LIBRARY.

The Institution possesses an excellent collection of literature relating to the subject of aeronautics, which is kept in the room last mentioned. This very valuable series of publications is rich in periodicals, especially those of early date. During the year all the books were reclassified and the volumes of periodicals were collated and made ready for binding.

ART ROOM AND EMPLOYEES' LIBRARY.

No additions to the works on art contained in this room were made during the year and the arrangement remained unchanged. All works relating to other subjects than art have been eliminated, and those properly belonging in the room are in good condition and readily accessible.

No changes were made in the small collection of general literature known as the employees' library for the reasons mentioned in last year's report.

NEW STEEL BOOKSTACKS.

The estimates for the fiscal year 1914 contained an item of \$40,000 for the erection of metal bookstacks in the main hall of the Smithsonian building, to contain the library of the Bureau of American Ethnology, a part of the National Museum library, together with books belonging to other branches of the Institution, and certain collections of Smithsonian books used by the scientific and administrative staff. Toward the close of the fiscal year covered by this report Congress appropriated the sum of \$15,000 for beginning this work, and arrangements were immediately made to secure a design for the bookstacks. In accordance with the plan proposed, a floor space at each end of the hall measuring 50 feet by 26 feet will be devoted to the stacks, which will be arranged in three tiers and reach from the floor to the ceiling. In order to increase the shelf capacity and at the same time preserve the appearance of the hall, a series of bookcases about 8 feet high will be carried along the north and south walls, connecting with the stacks at each end. The object of this arrangement is to concentrate the various collections of books as far as practicable and at the same time to preserve the symmetry of the hall, and to leave the central portion open for exhibits and for various Smithsonian gatherings. A portion of the space will probably be needed for the preservation and display of the personal relics of James Smithson and for objects illustrating the work of the several branches of the Institution.

CATALOGUE OF SMITHSONIAN PUBLICATIONS.

A contract was entered into, during the year for the preparation of a complete catalogue of the publications of the Institution and its branches in book form. It is expected that the manuscript will be finished within a few months and that means will be found to print and issue the catalogue without serious delay.

LIBRARIES OF THE GOVERNMENT BRANCHES.

United States National Museum.—In accordance with the plans approved last year, four rooms at the northeast corner of the new building of the National Museum on the ground floor (Nos. 24, 26, 27, and 28) were fitted with steel bookstacks and other library appliances of the latest design for the reception of the portion of the Museum library needed in connection with the study and classification of the natural history and other collections in that building. The three rooms on the north side of the corridor not being separated by partitions, the entire space of 107 feet by 21 feet was divided into three portions of unequal dimensions, the western portion being assigned for a general reading room, and also for the card catalogues, reference books, charging desk, etc. The middle portion, of smaller dimensions, for quiet reading; and the larger eastern portion for the general stacks. The stacks are in two tiers separated by a glass floor. In the middle room the arrangement is similar, except that a large table occupies the central floor space. A gallery which extends around three sides of the general reading room also supports stacks, and on the ground floor additional shelving occupies the east wall of this room. Open shelves for current numbers of periodicals occupy the space under the windows. Two steel manuscript cases have been placed in the middle room, and a small lift for raising books to the upper or mezzanine floor, and suitable staircases have also been provided. A special feature of the stack room is that every second stack is but $3\frac{1}{2}$ feet high instead of 7 feet. This arrangement reduces the total shelf capacity a little, but provides a place on which to lay books when they are being rearranged or used by readers. As the members of the staff and other students are permitted to consult books in the stack room, the provision is a necessary one.

The room on the south side of the corridor (No. 27) was arranged as an office for the assistant librarian and the cataloguers. Bookstacks extend around the walls of the room on three sides, and there are two additional stacks, dividing the room practically into three.

The steel stacks were completed about October 15, 1912, and the moving of books from the old quarters was begun immediately. The task of placing the books on the new shelves occupied about a month,

during which time they were, nevertheless, available for use by readers and the delivery of books to the sectional libraries was not interrupted. For moving, the books were tied together in lots of convenient size for handling, and each lot received a number. It was then a simple matter to put the books in their proper places on the shelves in the new library. After they were in place, the library was fortunately able to employ temporary assistants to go over them all for the purpose of checking up the various series and ascertaining whether the volumes were all present and in their proper sequence.

The arrangement of the cards belonging to the Zurich catalogue of scientific literature has been perfected, and they are now available for reference.

In accordance with the plans decided upon, as mentioned in last year's report, the books on museum administration, technology, history, botany, and some other subjects were allowed to remain in the old quarters, where they would be most readily accessible to the members of the staff and others working in those lines. It is the intention, however, to transfer the botanical books to the new stacks in the Smithsonian Building as soon as the latter shall have been completed.

This portion of the library was rearranged and recatalogued as rapidly as possible, and with the aid of additional help the publications had been classified on the shelves at the close of the year and about one-half of them recatalogued. The following work in this direction was accomplished during the year: Books catalogued, 1,370; pamphlets, 2,416; total number of cards made, 3,132. Completed volumes of periodicals catalogued, 2,938; parts of publications, 19,059; total number of cards made, 1,117.

During the year 881 volumes were prepared for binding and sent to the Government bindery for that purpose.

Many important gifts were received by the library during the year, and the following members of the staff presented publications: Secretary Charles D. Walcott, Dr. Theodore N. Gill, Dr. William H. Dall, Mr. Robert Ridgway, Dr. C. W. Richmond, Dr. J. C. Crawford, Dr. O. P. Hay, and Mr. W. R. Maxon.

The Museum library now contains 43,692 volumes, 72,042 unbound papers, and 122 manuscripts. The accessions during the year covered by this report consisted of 1,690 books, 2,213 pamphlets, and 159 parts of volumes. The number catalogued, exclusive of those mentioned above, was as follows: 782 books, 892 complete volumes of periodicals, and 2,229 pamphlets.

The number of books, periodicals, and pamphlets borrowed from the general library amounted to 25,846, among which were 3,888 obtained from the Library of Congress, 117 from the Department of

Agriculture, 71 from the Army Medical Museum and library, 59 from the United States Geological Survey, and 19 from other libraries. Publications to the number of 4,832 were assigned to the sectional libraries of the Museum during the year.

The following is a complete list of the sectional libraries now existing:

Administration.	Marine invertebrates.
Administrative assistant's office.	Materia medica.
Anthropology.	Mechanical technology.
Biology.	Mollusks.
Birds.	Oriental archeology.
Botany.	Paleobotany.
Comparative anatomy.	Parasites.
Editor's office.	Photography.
Ethnology.	Physical anthropology.
Fishes.	Prehistoric archeology.
Geology.	Reptiles and batrachians.
Graphic arts.	Superintendent's office.
Insects.	Taxidermy.
Invertebrate paleontology.	Textiles.
Mammals.	Vertebrate paleontology.

The records of the Museum library consist of an author's catalogue, an accession book, a periodical record on standard cards, and a lending record. This lending record is on cards and includes books borrowed from the Library of Congress and other libraries for the use of the staff.

The library is largely dependent upon the exchange of Museum publications as a means of increase. During the year many letters asking for missing parts and for new exchanges were sent out, and a number of sets were completed in this way and new publications also added to the library.

Bureau of American Ethnology.—The report on this library will be made by the ethnologist in charge and incorporated in his general report on the operations of the bureau.

Astrophysical Observatory.—The small collection of books constituting the reference library of the Astrophysical Observatory was rearranged in the cases in the main hall of the Smithsonian Building, to which they were transferred from one of the tower rooms. During the year 90 volumes, 21 parts of volumes, and 69 pamphlets were received. This collection of books will eventually be placed in the new steel stacks, for which an appropriation was made at the last session of Congress.

National Zoological Park.—A small number of books on zoological subjects are kept in the office of the superintendent of the park. During the year 13 volumes and 10 pamphlets were added.

SUMMARY OF ACCESSIONS.

The following statement summarizes all the accessions during the year, except those made to the library of the Bureau of American Ethnology:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets (see p. 94)-----	12, 930
To the Smithsonian office, Astrophysical Observatory, and Zoological Park-----	573
To the United States National Museum-----	4, 062
Total-----	17, 565

Very respectfully,

F. W. TRUE,
*Assistant Secretary, in charge
of Library and Exchanges.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1913.

The International Catalogue of Scientific Literature now consists of 33 regional bureaus, a new bureau representing the Argentine Republic having been recently established at the Universidad de Buenos Aires. It appears probable that Bolivia will soon also be represented by a regional bureau. The following-named countries are represented by regional bureaus supported in most cases by direct governmental grants: Argentine Republic, Austria, Belgium, Canada, Cuba, Denmark, Egypt, Finland, France, Germany, Greece, Holland, Hungary, India and Ceylon, Italy, Japan, Mexico, New South Wales, New Zealand, Norway, Poland, Portugal, Queensland, Russia, South Africa, South Australia, Spain, Straits Settlements, Sweden, Switzerland, United States of America, Victoria and Tasmania, and Western Australia.

These bureaus, acting through the London Central Bureau, form the organization of the International Catalogue of Scientific Literature, whose duty it is to collect, index, classify, and publish a current catalogue of the world's scientific literature. The London Central Bureau assembles, edits, and publishes the classified references supplied by the regional bureaus.

The enterprise was begun in 1901 and since then there have been published annually 17 volumes, one each year for the following-named branches of science: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology.

All of the first 9 annual issues of the catalogue have been published, 14 volumes of the tenth issue, and 2 volumes of the eleventh, a total of 169 regular volumes in addition to several special volumes of Schedules and Lists of Journals.

The annual subscription price for a complete set of 17 volumes is \$85. The receipts from the sale of the catalogue are used for the maintenance of the central bureau, which pays for editing and printing the catalogue. The balance sheet for the ninth annual issue showed a credit for that issue of about \$1,500 over and above expenses. This is considered a satisfactory showing in view of the fact that undertakings of this kind are in no sense commercial and can hardly be expected to meet necessary expenses without aid from an endowment or some similar source. The enterprise was begun without a working capital other than the sums advanced from time to time by the Royal Society of London. As interest is paid on all sums so advanced the financial showing is not what it would have been had the enterprise possessed a working capital. The sum needed to completely pay off all obligations and leave a substantial balance for the maintenance of the central bureau is only about \$75,000, and it would be difficult to find an object more deserving of assistance and encouragement than this International Catalogue of Scientific Literature whose purpose is to aid research and investigations in scientific fields by furnishing a current classified index to the literature of science. Some idea of the extent of the work may be gained from the fact that about two and one-half million classified citations were received by the central bureau from the regional bureaus since the beginning of the enterprise in 1901, of these over 290,000 were prepared by the regional bureau of the United States.

During the year 27,995 cards were sent from this bureau to the London Central Bureau, as follows:

Literature of—

1902.....	9
1903.....	5
1904.....	12
1905.....	14
1906.....	131
1907.....	226
1908.....	324
1909.....	685
1910.....	3, 214
1911.....	6, 950
1912.....	16, 425
Total.....	27, 995

The following table shows the number of cards sent each year as well as the number of cards representing the literature of each year from 1901 to 1912, inclusive:

Literature of—	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	Total for year.
Year ending June 30—													
1902.....	6,990												6,990
1903.....	6,150	8,330											14,480
1904.....	3,044	9,424	8,745										21,213
1905.....	1,619	2,780	11,143	8,640									24,182
1906.....	301	622	3,538	12,139	9,001								25,601
1907.....	384	511	862	5,272	9,022	12,578							28,629
1908.....	408	523	366	956	5,629	7,217	13,429						28,528
1909.....	133	235	373	309	1,656	4,410	8,509	18,784					34,409
1910.....	72	173	248	466	1,163	1,502	3,160	6,305	11,994				25,082
1911.....	3	26	28	218	129	374	423	1,301	8,836	14,682			26,020
1912.....			4	243	386	562	1,490	1,949	3,372	5,231	13,974		27,201
1913.....		9	5	12	14	131	226	324	685	3,214	6,950	16,425	27,995
Total.....	19,104	22,633	25,312	28,254	27,000	26,774	27,227	28,663	24,887	23,127	20,924	16,425	290,330

Control over the catalogue is vested in a body known as the International Convention which has held two meetings in London, the last being in 1910. In the intervals between the meetings of this body the administration of the catalogue is directed by the International Council expected to meet in London once in three years and to which each country represented by a regional bureau is requested to send a representative.

Meetings of the International Council were held in 1904, 1907, and in 1909, and a meeting of the International Convention was held in 1910, so that a meeting of the International Council was planned for 1913. This meeting, by a vote of the executive committee, was postponed until 1914, as a number of new plans for the reduction of cost and increasing the efficiency of the catalogue were either just going into effect, or had been in operation but a short time, and it was felt that the later date would give the members of the council a better opportunity to judge their value.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1913:

The Institution proper published during the year 40 papers in the series of "Smithsonian Miscellaneous Collections," an annual report, and pamphlet copies of 37 papers from the general appendix of the report. The Bureau of American Ethnology published an annual report and 3 bulletins, and the United States National Museum issued 96 miscellaneous papers from the Proceedings, a new bulletin, reprint editions of 2 bulletins, and 9 parts of volumes pertaining to the National Herbarium.

The total number of copies of publications distributed by the Institution proper during the year was 111,283, or 1,052 more than during the previous year. This aggregate includes 600 volumes and memoirs of Smithsonian Contributions to Knowledge, 62,688 volumes and pamphlets of Smithsonian Miscellaneous Collections, 22,401 volumes and pamphlets of the Smithsonian Annual Reports, 8,787 special publications, including volume 3 of the Annals of the Astrophysical Observatory and reports on the Harriman Alaska expedition; 15,070 volumes and pamphlets of the Bureau of American Ethnology publications, 1,646 Annual Reports of the American Historical Association, 8 publications of the United States National Museum, and 83 publications not of the Smithsonian Institution or its branches. The National Museum distributed a total of 71,600 copies of its several publications.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

No publications of this series were issued during the year.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 57, 2 papers were published; of volume 58, 1 paper, and title-pages and contents of the vol-

ume; of volume 59, 5 papers; of volume 60, 28 papers; of volume 61, 4 papers; in all, 40 papers. These are as follows:

Volume 57.

- No. 9. New York Potsdam-Hoyt Fauna. By Charles D. Walcott. Published September 14, 1912. 54 p., 13 pls. (Publ. 2136.)
 No. 10. Group terms for lower and upper Cambrian series of formations. By Charles D. Walcott. September 16, 1912. 3 p. (Publ. 2137.)

Volume 58.

- No. 2. Bibliography of the geology and mineralogy of tin. By Frank L. and Eva Hess. July 29, 1912. v, 408 p. (Publ. 1937.)
 Title-pages and contents. December 31, 1912. v p. (Publ. 2160.)

Volume 59.

- No. 11. Expeditions organized and participated in by the Smithsonian Institution in 1910 and 1911. July 17, 1912. 51 p., 1 pl., 56 figs. (Publ. 2087.)
 No. 16. New Rodents from British East Africa. By Edmund Heller. July 5, 1912. 20 p. (Publ. 2094.)
 No. 17. New Diptera from Panama. By J. R. Malloch. July 18, 1912. 8 p. (Publ. 2133.)
 No. 18. New species of landshells from Panama Canal Zone. By William H. Dall. July 27, 1912. 3 p., 2 pls. (Publ. 2134.)
 No. 20. The recognition of Pleistocene faunas. By Oliver P. Hay. August 17, 1912. 16 p., 10 figs. (Publ. 2139.)

Volume 60.

- No. 1. Three new species of Pipunculidæ (Diptera) from Panama. By J. R. Malloch. September 6, 1912. 4 p., 3 figs. (Publ. 2141.)
 No. 2. New mammals from eastern Panama. By E. A. Goldman. September 20, 1912. 18 p. (Publ. 2142.)
 No. 3. Descriptions of new genera, species, and subspecies of birds from Panama, Colombia, and Ecuador. By E. W. Nelson. September 27, 1912. 25 p. (Publ. 2143.)
 No. 4. Rubelzul cotton: A new species of Gossypium from Guatemala. By Frederick L. Lewton. October 21, 1912. 2 p., 2 pls. (Publ. 2144.)
 No. 5. Kokia: A new genus of Hawaiian trees. By Frederick L. Lewton. October 22, 1912. 4 p., 5 pls. (Publ. 2145.)
 No. 6. The cotton of the Hopi Indians: A new species of Gossypium. By Frederick L. Lewton. October 23, 1912. 10 p., 5 pls. (Publ. 2146.)
 No. 7. Descriptions of one hundred and four new species and subspecies of birds from the Barussan Islands and Sumatra. By Harry C. Oberholser. October 26, 1912. 22 p. (Publ. 2147.)
 No. 8. New genera and races of African ungulates. By Edmund Heller. November 2, 1912. 16 p. (Publ. 2148.)
 No. 9. A recent meteorite fall near Holbrook, Navajo County, Arizona. By George P. Merrill. November 21, 1912. 4 p. (Publ. 2149.)
 No. 10. The crinoids of the Natural History Museum at Hamburg. By Austin Hobart Clark. November 7, 1912. 33 p. (Publ. 2150.)

- No. 11. A fossil toothed cetacean from California, representing a new genus and species. By Frederick W. True. November 1, 1912. 7 p., 2 pls. (Publ. 2151.)
- No. 12. New races of insectivores, bats, and lemurs from British East Africa. By Edmund Heller. November 4, 1912. 13 p. (Publ. 2152.)
- No. 13. A study of the salinity of the surface water in the North Pacific Ocean and the adjacent enclosed seas. By Austin Hobart Clark. December 4, 1912. 33 p. (Publ. 2153.)
- No. 14. New mammals from the highlands of Siberia. By N. Hollister. November 29, 1912. 6 p. (Publ. 2157.)
- No. 15. A new subspecies of crossbill from Newfoundland. By A. C. Bent. December 12, 1912. 3 p. (Publ. 2158.)
- No. 16. Remains in Eastern Asia of the race that peopled America. By Aleš Hrdlička. December 31, 1912. 5 p., 3 pls. (Publ. 2159.)
- No. 17. Notes on American species of *Peripatus*, with a list of known forms. By Austin Hobart Clark. January 25, 1913. 5 p. (Publ. 2163.)
- No. 18. Smithsonian pyrhellometry revised. By C. G. Abbot and L. B. Aldrich. February 1, 1913. 7 p. (Publ. 2164.)
- No. 19. Description of a new gazelle from northwestern Mongolia. By N. Hollister. February 8, 1913. 2 p. (Publ. 2165.)
- No. 20. Description of a new African grass-warbler of the genus *Cisticola*. By Edgar A. Mearns. February 14, 1913. 2 p. (Publ. 2166.)
- No. 21. Two new subspecies of birds from the slopes of Mount Pirri, eastern Panama. By E. W. Nelson. February 26, 1913. 2 p. (Publ. 2167.)
- No. 22. Descriptions of new mammals from Panama and Mexico. By E. A. Goldman. February 28, 1913. 20 p. (Publ. 2168.)
- No. 24. Two new mammals from the Siberian Altai. By N. Hollister. March 13, 1913. 3 p. (Publ. 2171.)
- No. 25. Diagnosis of a new beaked whale of the genus *Mesoplodon* from the coast of North Carolina. By Frederick W. True. March 14, 1913. 2 p. (Publ. 2172.)
- No. 26. Notice of the occurrence of a Pleistocene camel north of the Arctic Circle. By James Williams Gidley. March 21, 1913. 2 p. (Publ. 2173.)
- No. 27. An extinct American eland. By James Williams Gidley. March 22, 1913. 3 p., 1 pl. (Publ. 2174.)
- No. 28. A new vole from eastern Mongolia. By Gerrit S. Miller, jr. March 31, 1913. 2 p., 1 pl. (Publ. 2175.)
- No. 29. Volcanoes and climate. By C. G. Abbot and F. E. Fowle. March 28, 1913. 24 p., 3 figs. (Publ. 2176.)

Volume 61.

- No. 2. Description of the skull of an extinct horse, found in central Alaska. By Oliver P. Hay. June 4, 1913. 18 p., 2 pls. (Publ. 2181.)
- No. 3. Report on fresh-water Copepoda from Panama, with descriptions of new species. By C. Dwight Marsh. June 20, 1913. 30 p., 5 pls. (Publ. 2182.)
- No. 4. *Saffordia*, a new genus of ferns from Peru. By William R. Maxon. May 26, 1913. 5 p., 2 pls., 1 fig. (Publ. 2183.)
- No. 5. A new dinosaur from the lance formation of Wyoming. By Charles W. Gilmore. May 24, 1913. 5 p., 5 figs. (Publ. 2184.)

The following papers of the Smithsonian Miscellaneous Collections were in press at the close of the fiscal year:

Volume 57.

- No. 11. Cambrian geology and paleontology. II. New Lower Cambrian subfauna. By Charles D. Walcott. 309-326 p., 50-54 pls. (Publ. 2185.)
- No. 12. Cambrian geology and paleontology. II. Cambrian formations of the Robson Peak district, British Columbia and Alberta, Canada. By Charles D. Walcott. 327-343 p., 55-59 pls. (Publ. 2186.)
- No. 13. Cambrian geology and paleontology. II. Dikelocephalus and other genera of the Dikelocephalinae. By Charles D. Walcott. 345-408 p., 60-70 pls. (Publ. 2187.)

Volume 59.

- No. 19. Early Norse Visits to North America. By William H. Babcock. III, 213 p., 10 pls. (Publ. 2138.)

Volume 60.

- No. 23. The influence of the atmosphere on our health and comfort in confined and crowded places. By Leonard Hill, Martin Flack, James McIntosh, R. A. Rowlands, and H. B. Walker. Hodgkins Fund. 96 p. (Publ. 2170.)
- No. 30. Explorations and field-work of the Smithsonian Institution in 1912. 76 p., 82 figs. (End of volume.) (Publ. 2178.)

Volume 61.

- No. 1. The White Rhinoceros. By Edmund Heller. 77 p., 31 pls. (Publ. 2180.)

SMITHSONIAN ANNUAL REPORTS.

Report for 1911.

The Annual Report of the Board of Regents for 1911 was received from the Public Printer in completed form in January, 1913.

Annual Report of the Board of Regents of the Smithsonian Institution, showing operations, expenditures, and conditions of the Institution for the year ending June 30, 1911. xii, 688 p., 97 pls. (Publ. 2095.)

Small editions of the following papers, forming the general appendix of the annual report for 1911, were issued in pamphlet form:

- The gyrostatic compass. By H. Marchand. 5 p., 3 pl. (Publ. 2096.)
- Radiotelegraphy. By G. Marconi. 15 p., 1 pl. (Publ. 2097.)
- Multiplex telephony and telegraphy by means of electric waves guided by wires. By George O. Squier. 21 p., 1 pl. (Publ. 2098.)
- Recent experiments with invisible light. By R. W. Wood. 12 p., 6 pls. (Publ. 2099.)
- What electrochemistry is accomplishing. By Joseph W. Richards. 16 p. (Publ. 2100.)
- Ancient and modern views regarding the chemical elements. By William Ramsay. 15 p. (Publ. 2101.)

- The fundamental properties of the elements. By Theodore William Richards. 17 p. (Publ. 2102.)
- The production and identification of artificial precious stones. By Noel Heaton. 18 p., 3 pls. (Publ. 2103.)
- The sterilization of drinking water by ultra-violet radiations. By Jules Courmont. 11 p. (Publ. 2104.)
- The legal time in various countries. By M. Philippot. 8 p. Map. (Publ. 2105.)
- Some recent interesting developments in astronomy. By J. S. Plaskett. 16 p. (Publ. 2106.)
- The age of the earth. By J. Joly. 23 p. (Publ. 2107.)
- International air map and aeronautical marks. By Ch. Lallemand. 8 p. (Publ. 2108.)
- Geologic work of ants in tropical America. By J. C. Branner. 31 p., 1 pl. (Publ. 2109.)
- On the value of the fossil floras of the arctic regions as evidence of geological climates. By A. G. Nathorst. 10 p. (Publ. 2110.)
- Recent advances in our knowledge of the production of light by living organisms. By F. Alex. McDermott. 18 p. (Publ. 2111.)
- Organic evolution; Darwinian and de Vriesian. By N. C. Macnamara. 16 p. (Publ. 2112.)
- Magnalia naturæ; or the greater problems of biology. By D'Arcy Wentworth Thompson. 15 p. (Publ. 2113.)
- A history of certain great horned owls. By Charles R. Keyes. 11 p., 8 pls. (Publ. 2114.)
- The passenger pigeon. By Pehr Kalm (1759) and John James Audubon (1831). 18 p., 1 pl. (Publ. 2115.)
- Note on the iridescent colors of birds and insects. By A. Mallock. 8 p., 3 pls. (Publ. 2116.)
- On the positions assumed by birds in flight. By Bentley Beetham. 7 p., 8 pls. (Publ. 2117.)
- The garden of serpents, Butantan, Brazil. By S. Pozzi. 6 p. (Publ. 2118.)
- Some useful native plants from New Mexico. By Paul C. Standley. 16 p., 13 pls. (Publ. 2119.)
- The tree ferns of North America. By William R. Maxon. 29 p., 15 pls. (Publ. 2120.)
- The value of ancient Mexican manuscripts in the study of the general development of writing. By Alfred M. Tozzer. 14 p., 5 pls. (Publ. 2121.)
- The discoverers of the art of iron manufacture. By W. Belck. 15 p. (Publ. 2122.)
- The Kabyles of north Africa. By A. Lissauer. 16 p., 12 pls. (Publ. 2123.)
- Chinese architecture and its relation to Chinese culture. By Ernst Boerschmann. 29 p., 10 pls. (Publ. 2124.)
- The Lolos of Kientchang, western China. By A. F. Legendre. 18 p., 4 pls. (Publ. 2125.)
- The physiology of sleep. By R. Legendre. 16 p. (Publ. 2126.)
- Profitable and fruitless lines of endeavor in public health work. By Edwin O. Jordan. 8 p. (Publ. 2127.)
- Factory sanitation and efficiency. By C.-E. A. Winslow. 6 p. (Publ. 2128.)
- The physiological influence of ozone. By Leonard Hill and Martin Flack. 12 p. (Publ. 2129.)
- Traveling at high speeds on the surface of the earth and above it. By H. S. Hele-Shaw. 21 p. (Publ. 2130.)

Robert Koch, 1843-1910. By C. J. M. 8 p., 1 pl. (Publ. 2131.)

Sir Joseph Dalton Hooker, 1817-1911. By Lieut. Col. D. Prain. 13 p., 1 pl. (Publ. 2132.)

Report for 1912.

The report of the executive committee and proceedings of the Board of Regents of the Institution, as well as the report of the Secretary for the fiscal year ending June 30, 1912, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in December, 1912, as follows:

Report of the executive committee and Proceedings of the Board of Regents for the year ending June 30, 1912. 22 pp. (Publ. 2155.)

Report of the secretary of the Smithsonian Institution for the year ending June 30, 1912. iii, 110 p., 2 pl. (Publ. 2156.)

The general appendix to the Smithsonian Report for 1912 was in type, but actual presswork was not completed at the close of the fiscal year. In the general appendix are the following papers:

The year's progress in astronomy, by P. Puiseux.

The spiral nebulae, by P. Puiseux.

The radiation of the sun, by C. G. Abbot.

Molecular theories and mathematics, by Émile Borel.

Modern mathematical research, by G. A. Miller.

The connection between the ether and matter, by Henri Poincaré.

Experiments with soap bubbles, by C. V. Boys.

Measurements of infinitesimal quantities of substances, by William Ramsay.

The latest achievements and problems of the chemical industry, by Carl Duisberg.

Holes in the air, by W. J. Humphreys.

Review of applied mechanics, by L. Lecornu.

Report on the recent great eruption of the volcano "Stromboli," by Frank A. Perret.

The glacial and postglacial lakes of the Great Lakes region, by Frank B. Taylor.

Applied geology, by Alfred H. Brooks.

The relations of paleobotany to geology, by F. H. Knowlton.

Geophysical research, by Arthur L. Day.

A trip to Madagascar, the country of beryls, by A. Lacroix.

The fluctuating climate of North America, by Ellsworth Huntington.

The survival of organs and the "culture" of living tissues, by R. Legendre.

Adaptation and inheritance in the light of modern experimental investigation, by Paul Kammerer.

The paleogeographical relations of antarctica, by Charles Hedley.

The ants and their guests, by P. E. Wasmann.

The penguins of the antarctic regions, by L. Gain.

The derivation of the European domestic animals, by C. Keller.

Life: its nature, origin, and maintenance, by E. A. Schäfer.

The origin of life: a chemist's fantasy, by H. E. Armstrong.

The appearance of life on worlds and the hypothesis of Arrhénius, by Alphonse Berget.

The evolution of man, by G. Elliot Smith.

The history and varieties of human speech, by Edward Sapir.

Ancient Greece and its slave population, by S. Zaborowski.

Origin and evolution of the blond Europeans, by Adolphe Bloch.

History of the finger-print system, by Berthold Laufer.

Urbanism: A historic, geographic, and economic study, by Pierre Clerget.

The Sinai problem, by E. Oberhummer.

The music of primitive peoples and the beginnings of European music, by Willy Pastor.

Expedition to the South Pole, by Roald Amundsen.

Icebergs and their location in navigation, by Howard T. Barnes.

Henri Poincaré, his scientific work, his philosophy, by Charles Nordmann.

SPECIAL PUBLICATIONS.

The following special publications were issued in octavo form:

Publication lists.

Classified list of Smithsonian publications available for distribution January 1, 1913. Published February 25, 1913. vi, 31 p. (Publ. 2161.)

Publications of the Smithsonian Institution issued between January 1 and July 1, 1912. July 19, 1912. 2 p. (Publ. 2135.)

Publications of the Smithsonian Institution issued between January 1 and October 1, 1912. October 28, 1912. 3 p. (Publ. 2154.)

Publications of the Smithsonian Institution issued between January 1 and December 31, 1912. February 1, 1913. 5 p. (Publ. 2162.)

Publications of the Smithsonian Institution issued between January 1 and March 31, 1913. April 10, 1913. 1 p. (Publ. 2179.)

Zoological nomenclature.

Opinions rendered by the International Commission on Zoological Nomenclature, Opinions 52-56. May 10, 1913. 12 p. (Publ. 2169.)

The following special publication was in press at the close of the fiscal year:

Harriman Alaska series.

Vol. 14. Monograph of Shallow-water Starfishes of the North Pacific Coast from the Arctic Ocean to California. By Addison Emery Verrill. xii, 338 p., 110 pl. (Publ. 2140.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the proceedings of the United States National Museum, and (c) the bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

The publications issued by the National Museum during the year comprised 96 papers of the Proceedings, 2 bulletins, and 9 parts of Contributions from the National Herbarium.

The issues of Proceedings were as follows: Vol. 42, papers 1907 to 1922, inclusive; Vol. 43, papers 1923 to 1945, inclusive; Vol. 44, papers 1946 to 1975, inclusive; Vol. 45, papers 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, and 2004; a total of 96 papers.

The bulletins were as follows:

Bulletin 79. List of North American Land Mammals in the United States National Museum, 1911. By Gerrit S. Miller, jr.

Bulletin 81. Synopsis of the Rotatoria. By Harry K. Harring.

In the series of Contributions from the National Herbarium (octavo) there appeared:

Volume 16.

Part 3. The North American species of Nymphaea. By Gerrit S. Miller, jr., and Paul C. Standley.

Part 4. Descriptions of new plants preliminary to a report upon the flora of New Mexico. By E. O. Wootton and Paul C. Standley.

Part 5. Miscellaneous Papers. By C. V. Piper, J. N. Rose, Paul C. Standley, W. E. Safford, and E. S. Steele.

Part 6. Three new genera of stilt palms (Iriarteaceae) from Colombia, with a synoptical review of the family. By O. F. Cook and C. B. Doyle.

Part 7. Studies in Cactaceae. Part 1. By N. L. Britton and J. N. Rose.

Part 8. Relationships of the false date palm of the Florida Keys, with a synoptical key to the families of American palms. By O. F. Cook.

Part 9. The genus Epiphyllum and its allies. By N. L. Britton and J. N. Rose.

Volume 17.

Part 1. The lichen flora of southern California. By Hermann Edward Hasse.

Part 2. Studies of tropical American ferns. No. 4. By William R. Maxon.

There was also reprinted an edition of 500 copies of Bulletin 71, Part 2, A monograph of the Foraminifera of the North Pacific Ocean. Part II. Textulariidae, by Joseph A. Cushman; and an edition of 100 reprints of Bulletin 79, List of North American Land Mammals in the United States National Museum, 1911, by Gerrit S. Miller, jr.

Among the National Museum publications in press at the close of the year were: Bulletin 80, A descriptive account of the building recently erected for the departments of natural history of the United States National Museum, by Richard Rathbun. 131 p., 34 pl., and the annual report for 1912.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed elsewhere in the Secretary's report. The editorial work is in the charge of Mr. J. G. Gurley.

One annual report and two new bulletins, together with a partially revised edition of a third bulletin, were issued during the year, as follows:

Twenty-eighth Annual Report, containing ("Accompanying Papers," as follows:

- (1) Casa Grande, by Jesse Walter Fewkes; (2) Antiquities of the Upper Verde River and Walnut Creek Valleys, Arizona, by Jesse Walter Fewkes; (3) Preliminary Report on the Linguistic Classification of Algonquian Tribes, by Truman Michelson.)

Bulletin 30. Handbook of American Indians North of Mexico, edited by Frederick Webb Hodge. [By concurrent resolution of Congress in August, 1912, a reprint of this bulletin was ordered in an edition of 6,500 copies, of which 4,000 were for the use of the House of Representatives, 2,000 for the use of the Senate, and 500 for the use of the bureau. This reprint, in which were incorporated such desirable alterations as could be conveniently made without affecting the pagination of the work, was issued in January, 1913.]

Bulletin 52. Early Man in South America. By Aleš Hrdlička in collaboration with William H. Holmes, Bailey Willis, Fred. Eugene Wright, and Clarence N. Fenner.

Bulletin 54. The Physiography of the Rio Grande Valley, New Mexico, in Relation to Pueblo Culture. By Edgar Lee Hewett, Junius Henderson, and Wilfred William Robbins.

The Twenty-ninth Annual Report ("Accompanying Paper," The Ethnogeography of the Tewa Indians, by John Peabody Harrington) was in press at the close of the year.

PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY.

Volume III of the Annals of the Smithsonian Astrophysical Observatory was printed and nearly ready for distribution at the close of the fiscal year.

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution, and are communicated to Congress under the provisions of the act of incorporation of the association.

The annual report for 1910 was published October 22, 1912, with contents as follows:

Report of the proceedings of the twenty-sixth annual meeting of the American Historical Association. By Waldo G. Leland, secretary.

Report of the proceedings of the seventh annual meeting of the Pacific coast branch. By Jacob N. Bowman, secretary of the branch.

The efforts of the Danish Kings to secure the English crown after the death of Harthacnut. By Laurence M. Larson.

The records of the privy seal. By James F. Baldwin.

Royal purveyance in fourteenth-century England in the light of Simon Islip's Speculum Regis. By Chalfant Robinson.

Anglo-Dutch relations, 1654-1660. By Ralph C. H. Catterall.

- Some critical notes on the works of S. R. Gardiner. By Roland G. Usher.
- The Mexican policy of southern leaders under Buchanan's administration. By James Morton Callahan.
- The decision of the Ohio Valley. By Carl Russell Fish.
- North Carolina on the eve of secession. By William K. Boyd.
- The inception of the Montgomery convention. By Armand J. Gerson.
- The attitude of Congress toward the Pacific Railway, 1856-1862. By Allen Marshall Kline.
- The work of the Western State Historical Society, as illustrated by Nevada. By Jeanne E. Wier.
- Proceedings of the seventh annual conference of historical societies.
- The study of history in secondary schools. Report of the Committee of Five.
- Eleventh annual report of the public archives commission. By Herman V. Ames, chairman.
- Appendix A. Proceedings of the second annual conference of archivists.
- Appendix B. Report on the archives of the State of Indiana. By Harlow Lindley.
- Appendix C. Report on the archives of the State of Kentucky. By Irene T. Myers.
- Appendix D. Report on the archives of the State of Nebraska. By Addison E. Sheldon.
- Appendix E. Notes on the archives of the Philippines. By James A. Robertson.
- Writings on American History, 1910. By Grace G. Griffin.

The report for 1911, in two volumes, was sent to the printer on January 9, 1913, and at the close of the year was nearly ready for distribution. The contents are as follows:

Volume I.

- Report of the proceedings of the twenty-seventh annual meeting of the American Historical Association. By Waldo G. Leland, secretary.
- Report of the proceedings of the eighth annual meeting of the Pacific coast branch. By H. W. Edwards, secretary of the branch.
- The archives of the Venetian Republic. By Theodore F. Jones.
- Materials for the history of Germany in the sixteenth and seventeenth centuries. By Sidney B. Fay.
- The materials for the study of the English cabinet in the eighteenth century. By Edward Raymond Turner.
- François de Guise and the taking of Calais. By Paul van Dyke.
- Factions in the English privy council under Elizabeth. By Conyers Read.
- Anglo-Dutch relations, 1671-1672. By Edwin W. Pahlow.
- American-Japanese intercourse prior to the advent of Perry. By Inazo Nitobe.
- Colonial society in America. By Bernard Moses.
- French diplomacy and American politics, 1794-1795. By James Alton James.
- The insurgents of 1811. By D. R. Anderson.
- The tariff and the public lands from 1828 to 1833. By Raynor G. Wellington.
- The "Bargain of 1844" as the origin of the Wilmot proviso. By Clark E. Persinger.
- Monroe and the early Mexican revolutionary agents. By Isaac Joslin Cox.
- Public opinion in Texas preceding the Revolution. By Eugene C. Barker.
- Relations of America with Spanish America, 1720-1744. By H. W. V. Temperley.
- The genesis of the Confederation of Canada. By Cephas D. Allin.

Proceedings of the eighth annual conference of historical societies.

List of European historical societies.

Twelfth report of the public archives commission. By Herman V. Ames, chairman.

Appendix A. Proceedings of the third annual conference of archivists.

Appendix B. Report on the archives of the State of Colorado. By James F. Willard.

Appendix C. List of commissions and instructions to governors and lieutenant governors of American and West Indian Colonies, 1609-1784.

Writings on American history, 1911. By Grace G. Griffin.

Volume II.

Ninth report of the historical manuscripts commission: Correspondence of Alexander Stephens, Howell Cobb, and Robert Toombs.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Fifteenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1912, was communicated to Congress March 19, 1913.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian publications. The committee also considered forms of routine, blanks, and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty-two meetings were held and 138 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

DR. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 9.

HODGKINS FUND.

ADVISORY COMMITTEE ON THE LANGLEY AERODYNAMICAL LABORATORY.¹

OFFICIAL STATUS.

Authorization.—On May 1, 1913, the Regents of the Smithsonian Institution, approving a general scheme submitted by Secretary Walcott, authorized the secretary, with the approval of the executive committee, to reopen the Langley Aerodynamical Laboratory; to appoint an advisory committee; to add, as means are provided, other laboratories and agencies; to group them into a bureau organization; and to secure the cooperation with them of the Government and other agencies.

Functions.—The committee is to advise as to the organization and work of the Langley Aerodynamical Laboratory and of the bureau organization when adopted, and the coordination of their activities with the kindred labors of other establishments, governmental and private; it is to plan for such theoretical and experimental investigations, tests, and reports as may serve to increase the safety and effectiveness of aerial locomotion for the purposes of commerce, national defense, and the welfare of man. But neither the committee nor the Smithsonian Institution will promote patented devices, furnish capital to inventors, or manufacture commercially, or give regular courses of instruction for aeronautical pilots or engineers.

The organization, under regulations to be established and fees to be fixed by the secretary, approved by the Smithsonian executive committee, may exercise its functions for the military and civil departments of the Government of the United States, and also for any individual, firm, association, or corporation within the United States; provided, however, that such department, individual, firm, association, or corporation shall defray the cost of all material used and of all services of persons employed in the exercise of such functions.

With the approval of the Secretary of the Institution, the committee is to collect aeronautical information, such part of the same as may be valuable to the Government, or the public, to be issued in bulletins and other publications.

¹ Reprinted from Smithsonian Miscellaneous Collections, vol. 62, No. 1, 1913.

Membership and Privileges.—The advisory committee is to be composed of the director of the Langley Aerodynamical Laboratory, when appointed, and one member to be designated by the Secretary of War, one by the Secretary of the Navy, one by the Secretary of Agriculture, and one by the Secretary of Commerce, together with such other persons, to be designated by the Secretary of the Smithsonian Institution, as may be acquainted with the needs of aeronautics, the total membership of such committee not to exceed 14.

The members of the advisory committee, as such, are to serve without compensation, but will have refunded the necessary expenses incurred by them in going to Washington to attend the meetings of the committee and returning therefrom, and while attending the meetings.

Approval of the President.—On May 9, 1913, the President of the United States, by request of the Secretary of the Smithsonian Institution, approved the designation of representatives of the above-named departments to serve on the advisory committee.

ORGANIZATION.

Officers.—The advisory committee, as constituted at its organization meeting, convened by Secretary Walcott at the Smithsonian Institution, May 23, 1913, comprises a chairman, a recorder, and 12 additional members, all of whom are to serve for one year. The officers are to be elected annually on or about May 6, and the members for the ensuing year are to be appointed prior to the date of such election.

The chairman has general supervision of the work of the advisory committee, presides at its meetings, receives the reports of the subcommittees, and makes an annual report to the Secretary of the Smithsonian Institution. Said report must include an account of the work done for any department of the Government, individual, firm, association, or corporation, and the amounts paid by them to defray the cost of material and services, as hereinbefore mentioned.

The recorder keeps the minutes of the meetings of the committee and assists the chairman in conducting correspondence and preparing reports pertaining to the business of the committee.

Subcommittees.—The chairman, with the approval of the advisory committee, may appoint standing and special subcommittees to perform such functions as may be assigned to them.

The standing subcommittees may have assigned to them investigations and tests of a permanent character, which they may prosecute from year to year and on which they are to make quarterly reports to the chairman, followed by an annual report. Each subcommittee comprises a chairman, who must be a member of the advisory committee, and others, chosen by him from that committee or elsewhere.

AGENCIES, RESOURCES, AND FACILITIES.

Smithsonian Institution.—The advisory committee has been provided by the Smithsonian Institution with suitable office headquarters, an administrative and accounting system, library and publication facilities, lecture and assembly rooms, and museum space for aeronautic models. The Langley Aerodynamical Laboratory has an income provided for it not to exceed \$10,000 the first year (of which \$5,000 has been allotted), and \$5,000 annually for five years.

United States Bureau of Standards.—For the exact determination of aerophysical constants, the calibration of instruments, the testing of aeronautic engines, propellers, and materials of construction, the committee has the cooperation of the United States Bureau of Standards, from which the Secretary of Commerce has designated one representative.

This bureau has a complete equipment for studying the mechanics of materials and structural forms used in air-craft; for standardizing the physical instruments—thermometers, barographs, pressure gauges, etc.—used in air navigation; and for testing the power, efficiency, etc., of aeronautical motors in a current of air representing the natural conditions of flight.

In these general branches the technical staff of the bureau is prepared to undertake such theoretical and experimental investigations as may come before the advisory committee on behalf of either the Government or private individuals or organizations.

United States Weather Bureau.—For studies of and reports on every phase of aeronautic meteorology, besides the usual forecasting, the committee has the cooperation of the United States Weather Bureau, from which the Secretary of Agriculture has designated one representative.

This bureau has an extensive library of works on or allied to aeronautics, an instrument division for every type of apparatus for studying the state of the atmosphere, a whirling table of 30-foot radius for standardizing anemometers, a complete kite equipment with power reel, and a sounding balloon equipment with electrolytic hydrogen plant, all of which are available for scientific investigations. For special forecasts, anticipating field tests or cross-country voyages, the general service of the bureau may be called upon.

War and Navy Departments.—These departments, while especially interested in aeronautics for national defense, can be of service in advancing the general science. Each has an aeronautical library; each has an official representative in foreign countries who reports periodically on every important phase of the art, whether civil or military; each has an assignment of officers who design, test, and operate air craft, and who determine largely the scope and character

of their development; each has its aeronautic station equipped with machines in actual service throughout the year. Besides various aviation establishments, the War Department has a balloon plant at Fort Myer, Va., and at Omaha, Nebr.; the Navy has its marine model basin, useful for special experiments in aeronautics, its extensive shops at the Washington Navy Yard, available for the alteration or repair of air craft or the manufacture of improved military types, and at Fort Myer three lofty open-work steel towers suitable for studies in meteorology or aerodynamics in the natural wind. Furthermore, the Navy Department has detailed an officer for special research in aeronautics at one of the principal engineering schools.

Because of their fundamental interest in aeronautics, each of these departments has two representatives on the advisory committee, and each will be able to place at the service of the committee one or more skilled aviators and aeroplanes for systematic experimentation.

PRESENT NEEDS.

In presenting the needs of the organization, it is well to remark that the Smithsonian Institution possesses the unique character of being a private organization having governmental functions and prerogatives. It can receive appropriations directly from Congress; it can be the recipient or the custodian of private funds for the increase and diffusion of knowledge; it can deposit such private funds with the United States Treasury, or place them otherwise, as may be required by the donor. Likewise, it can be the recipient or custodian of material objects representing any province of nature or any branch of human knowledge or art. This unique character allows the public to anticipate or supplement the cooperation of Congress in promoting the aerodromical (aeronautical) work of the Institution.

Endowment funds.—Persons approving the purpose of the organization and desiring its continuity and permanence can not do better than to provide for it a steady income, either for general or for specific use. Individual endowment funds bearing the name of the giver or other person, and presented to the Smithsonian Institution, or placed in its custody at the disposal of the committee, may be recommended; also collective funds bearing the name of a society, organization, or section of the country, whether in the interest of scientific progress or of national defense.

Temporary funds.—For the prompt achievement of definite results, funds may well be offered for immediate application, both of principal and interest; as, for example, for the erection of laboratories or other buildings; for the purchase of experimental air craft, or apparatus, instruments, etc.

Most needed is an expansion of the Langley Aerodynamical Laboratory providing a large and a small wind tunnel, ampler shops, and

instrument and model rooms. Adjacent to this, or forming a part of it, may well be the headquarters of the committee, with the collections of aeronautic publications and exhibits, and with designing rooms where plans for air craft may be matured by fabricators in consultation with the technical staff. This new building, if placed on the Smithsonian grounds, should be of good architecture and cost not less than \$100,000.

Of immediate importance is an air-craft field laboratory, adjacent to ample flying space of land and water, and adapted to assembling, adjusting, and repairing several full-scale land and water aeroplanes, and subjecting them to indoor tests and measurements, as of stress, strain, factor of safety, center of gravity, moment of inertia, working condition, etc. One such plant suitably located would serve all governmental and civilian requirements for the present. A suitable site is the public land in Potomac Park in the vicinity of the Smithsonian Institution. Here might be held air-craft competitions under the auspices of the Government.

Prizes and awards.—As a stimulus to the highest aeronautic achievement, or as an honorable recognition thereof, suitable prizes or awards might advantageously be offered. Provision should be made for liberal cash prizes for competitive tests of motors, propellers, etc., in a purely scientific way not trenching upon the province of aero clubs.

Fellowships.—For the prosecution of special aeronautic investigations in cooperation with the advisory committee, educational institutions and scientific or engineering organizations should be provided with research fellowships whose incumbents may have the counsel of the committee and the advantage of its equipments.

Until adequate appropriations have been made by the Government the activities of the organization and committee will have to be sustained largely by private resources.



REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

FOR THE YEAR ENDING JUNE 30

1914



(Publication 2317)

WASHINGTON
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1914

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REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION

CHARLES D. WALCOTT

FOR THE YEAR ENDING JUNE 30, 1914.

To the Board of Regents of the Smithsonian Institution:

GENTLEMEN: I have the honor to submit herewith a report on the operations of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1914, including work placed by Congress under the direction of the Board of Regents in the United States National Museum, the Bureau of American Ethnology, the International Exchanges, the National Zoological Park, the Astrophysical Observatory, and the United States Bureau of the International Catalogue of Scientific Literature.

The general report reviews the affairs of the Institution proper and briefly summarizes the operations of its several branches, while the appendices contain detailed reports by the assistant secretary and others directly in charge of various activities. The reports on operations of the National Museum and the Bureau of American Ethnology will also be published as independent volumes.

THE SMITHSONIAN INSTITUTION.

THE ESTABLISHMENT.

The Smithsonian Institution was created an establishment by act of Congress approved August 10, 1846. Its statutory members are the President of the United States, the Vice President, the Chief Justice, and the heads of the executive departments.

THE BOARD OF REGENTS.

The Board of Regents consists of the Vice President and the Chief Justice of the United States as ex officio members, three Members of the Senate, three Members of the House of Representatives, and six citizens, "two of whom shall be resident in the city of Washington, and the other four shall be inhabitants of some State, but no two of them of the same State."

In regard to the personnel of the board, it becomes my sad duty to record the death on December 22, 1913, of Representative Irvin

S. Pepper, and of Senator Augustus O. Bacon, who died February 14, 1914. Representative Maurice Connolly has been appointed to succeed Mr. Pepper and Senator Henry French Hollis to succeed Senator Bacon. Representative Ernest W. Roberts has been appointed as successor to Representative John Dalzell, whose term of office as Member of Congress had expired.

The roll of Regents at the close of the fiscal year was as follows: Edward D. White, Chief Justice of the United States, Chancellor; Thomas R. Marshall, Vice President of the United States; Henry Cabot Lodge, Member of the Senate; Henry French Hollis, Member of the Senate; William J. Stone, Member of the Senate; Scott Ferris, Member of the House of Representatives; Maurice Connolly, Member of the House of Representatives; Ernest W. Roberts, Member of the House of Representatives; Andrew D. White, citizen of New York; Alexander Graham Bell, citizen of Washington, D. C.; George Gray, citizen of Delaware; Charles F. Choate, jr., citizen of Massachusetts; John B. Henderson, jr., citizen of Washington, D. C.; and Charles W. Fairbanks, citizen of Indiana.

At its meeting on January 15, 1914, the board filled a vacancy in the Executive Committee by the election of Hon. Maurice Connolly.

The annual meeting of the Board of Regents, adjourned from December 11, 1913, was held on January 15, 1914, and the proceedings of the meeting have been printed as usual for the use of the Regents, while such important matters acted upon as are of public interest are reviewed under appropriate heads in the present report of the secretary. The annual financial report of the Executive Committee has also been issued in the usual form, and a detailed statement of disbursements from Government appropriations under the direction of the Institution for the maintenance of the National Museum, the National Zoological Park, and other branches will be submitted to Congress by the secretary in the usual manner in compliance with the law.

GENERAL CONSIDERATIONS.

The "increase of knowledge" is one of the fundamental objects of the Smithsonian Institution, and one of the first acts of the Board of Regents in 1847 was to formulate a general plan of operations to carry out that purpose. Among the examples of lines of work for which appropriations were to be made from time to time were the following:

- (1) System of extended meteorological observations for solving the problem of American storms.

- (2) Explorations in descriptive natural history, and geological, mathematical, and topographical surveys, to collect material for the formation of a physical atlas of the United States.

(8) Solution of experimental problems, such as a new determination of the weight of the earth, of the velocity of electricity and of light, chemical analyses of soils and plants, collection and publication of articles of science accumulated in the offices of the Government.

(4) Institution of statistical inquiries with reference to physical, moral, and political subjects.

(5) Historical researches, and accurate surveys of places celebrated in American history.

(6) Ethnological researches, particularly with reference to the different races of men in North America; also explorations and accurate surveys of the mounds and other remains of the ancient people of our country.

It has been the aim of the Institution throughout its history to accomplish as much as practicable in all the fields of research above enumerated, and the secretaries of the Smithsonian have in their turn been chosen by the regents with that end in view. The first secretary, Professor Henry, was a physicist, and researches during his administration were largely in the domain of physics.

The present United States Weather Bureau is an outgrowth of the system of meteorological observations and warnings established by the Smithsonian Institution. In 1847 an appropriation was made "for instruments and other expenses connected with meteorological observations." The instruments thus secured were distributed throughout the country, and within two years the volunteer observers reporting to the Institution numbered about 400. In 1849 Henry realized the value of the electric telegraph as "a ready means of warning the more northern and southern observers to be on the watch for the first appearance of an advancing storm," and there was inaugurated a system of daily telegraphic weather reports, a system which was continued under the direction of the Institution until the beginning of the Civil War. On a large map in the Smithsonian building the weather over a considerable part of the country, according to reports received at 10 o'clock each day, was indicated by suitable symbols.

Under the second secretary, Professor Baird, biological science was one of the principal fields of research. It was during his administration that there was organized the United States Fish Commission for the study of the food fisheries of the United States, and Prof. Baird served as head of that commission until his death. The organization later became the United States Bureau of Fisheries of the Department of Commerce. Prof. Baird took a deep interest in the National Museum, and under his direction there was erected a building for the exhibition of the valuable collections acquired from the International Exhibition at Philadelphia in 1876.

Professor Langley, the third secretary, was both an astronomer and a physicist. But to his deep devotion to those professions may be added a broad view of the entire field of human knowledge. It was

during the administration of Langley that the Astrophysical Observatory was established to carry forward researches begun by him many years before. And the National Zoological Park, largely the outgrowth of investigations on living animals under the direction of Assistant Secretary Goode, was likewise founded during Langley's administration. To Langley himself the world owes a debt for his discoveries of the principles of aerial navigation and for his demonstration to the world on May 6, 1896, by the successful flight of an experimental machine, that an aeroplane heavier than air could be propelled through the air by its own power.

It would be interesting, were this the proper place, to review some of the results of the many important researches and explorations by the Institution in the last 60 years. The influence of the Institution is world-wide; through its international exchange service alone it has been in correspondence with more than 60,000 individuals and learned societies in the United States and practically in every land on the globe. During its entire existence there has been an unbroken record of friendly intercourse with every agency devoted to the encouragement of learning.

The extent of the activities of the Institution is limited only by the amount of the funds available. During recent years its private income has been supplemented on several occasions by friends of the Institution who have generously provided the means for carrying on certain explorations and lines of research, but opportunities for further important work constantly arise which must be declined or temporarily held in abeyance. Some of the projects proposed are such as could not properly be carried on through Government appropriation, but which the Smithsonian Institution could readily undertake were the means available.

The Institution was founded by the bequest of James Smithson, and from time to time it has been the recipient of other bequests and of gifts of various sums, the largest of which was the gift of Mr. Thomas G. Hodgkins, establishing the Hodgkins Fund. The Smithsonian permanent fund now aggregates a little more than a million dollars. A number of bequests, now awaiting settlement, will eventually result in considerably increasing the present fund. Among these I may mention—

Poore bequest.—By the terms of the will of the late George W. Poore, of Lowell, Mass., who died December 17, 1910, the Smithsonian Institution becomes his residuary legatee. As mentioned in my 1910 report, the estate, estimated at about \$40,000, is bequeathed under the condition that the income of this sum should be added to the principal until a total of \$250,000 should have been reached, and that then the income only should be used for the purposes for which the Institution was created.

As a reason for making this bequest to the Smithsonian Institution Mr. Poore in his will says:

I make this gift not so much because of its amount as because I hope it will prove an example for other Americans to follow, by supporting and encouraging so wise and beneficent an institution as I believe the Smithsonian Institution to be, and yet it has been neglected and overlooked by American citizens.

The affairs of this estate are being adjusted by the executor as rapidly as circumstances will permit.

Reid bequest.—In 1903 the Institution was informed of a proposed bequest to the Institution from Mr. Addison T. Reid, of Brooklyn, N. Y., to found a chair of biology in memory of the testator's grandfather, Asher Tunis. The bequest was subject to the condition that the income was to be paid in three equal shares to certain named legatees until their death, when the principal of the estate (then estimated at \$10,000), with accumulations, was to come to the Institution. One of the beneficiaries having died, the trust created for her benefit, amounting to \$4,795.91, was received by the Institution during the past year and deposited to the credit of the permanent fund in the United States Treasury.

Loeb bequest.—By the will of Morris Loeb, of New York City, the Smithsonian Institution is made a residual legatee and is to receive a one-tenth share of the estate remaining upon the death of the testator's wife. This legacy is to be used for the furtherance of knowledge in the exact sciences.

Morris Loeb, chemist, was born at Cincinnati May 23, 1863, and died October 8, 1912. He graduated from Harvard University in 1883 with the degree of A. B. and received the degree of Ph. D. from the University of Berlin in 1887 and Sc. D. from Union University in 1911. In 1891 he became professor of chemistry at the New York University. He was vice president of the American Chemical Society, and a member of the German Chemical Society and other scientific bodies.

Lucy Hunter Baird bequest.—Miss Baird, daughter of the late Spencer Fullerton Baird, Secretary of the Institution, died June 23, 1913. Besides giving to the National Museum and the Smithsonian Institution certain books, manuscripts, and other articles, the will of Miss Baird provides that upon the release of any portion of the trust estate by the death of the person entitled to the income thereof, said trust estate shall be given "to the Smithsonian Institution in trust as a fund to be known as 'the Spencer Fullerton Baird fund,' the interest shall be devoted, under the direction of the Smithsonian Institution to the expenses in whole or in part of a scientific exploration and biological research or for the purchase of specimens of natural objects or archæological specimens."

Chamberlain bequest.—In 1886 the National Museum received by bequest of Dr. Isaac Lea, of Philadelphia, an unrivaled collection of fresh-water mussels; and in 1894 a collection of gems and precious stones, also made by Dr. Lea, was bequeathed to the Museum by his daughter, Frances Lea Chamberlain, wife of Rev. Dr. Leander T. Chamberlain. Mrs. Chamberlain had taken a deep interest in her father's collections and had added materially thereto. Upon her death in 1894, Dr. Chamberlain assumed the trust and until his death in May, 1913, made large additions, particularly to the collection of gems and precious stones and in consequence of his gifts and collaboration was appointed honorary associate in mineralogy in the Museum.

In his will, Dr. Chamberlain bequeathed \$25,000 to the Smithsonian Institution to be known as the "Frances Lea Chamberlain fund," the income of which shall be used for "promoting the increase and the scientific value and usefulness of the Isaac Lea collection of gems and gem material," and the additional sum of \$10,000 as a fund, the income of which shall be used for promoting the scientific value and usefulness of the Isaac Lea collection of mollusks.

Sprague bequest.—Mr. Joseph White Sprague, of Louisville, Ky., died in Italy in June, 1900. His will provides that 85 per cent of the total income of the estate is to be distributed among certain devisees until their death, and then to several of their relatives for 20 years after the death of the last devisee, when the trust expires by limitation, and is to be paid to the Smithsonian Institution and to be known as "The Sprague Fund." Its purpose is to best promote the advancement of the physical sciences, and only one-half of each annual income is to be used, the other half to be added to the principal of the estate. In 1901, the estate was estimated to be worth \$200,000.

Fitzgerald bequest.—The will of Mr. Riter Fitzgerald, of Philadelphia, who died in 1911, makes certain definite bequests and leaves all the rest, residue and remainder of the estate, to his executors in trust, the net income to be paid quarterly to his niece, and should she die without leaving a child or children, the principal of the estate and interest accrued thereon is to be given "to the United States National Museum of the Smithsonian Institution, Washington, D. C." This part of the estate is appraised at between \$12,000 and \$13,000.

FINANCES.

The permanent fund of the Institution and the sources from which it was derived are as follows:

Deposited in the Treasury of the United States.

Bequest of James Smithson, 1846.....	\$515, 169. 00
Residuary legacy of James Smithson, 1867.....	26, 210. 63
Deposit of savings of income, 1867.....	108, 620. 37

Bequest of James Hamilton, 1875.....	\$1,000	
Accumulated interest on Hamilton fund, 1895.....	1,000	
		\$2,000.00
Bequest of Simeon Habel, 1880.....		500.00
Deposits from proceeds of sale of bonds, 1881.....		51,500.00
Gift of Thomas G. Hodgkins, 1891.....		200,000.00
Part of residuary legacy of Thomas G. Hodgkins, 1894.....		8,000.00
Deposit from savings of income, 1903.....		25,000.00
Residuary legacy of Thomas G. Hodgkins, 1907.....		7,918.69
Deposit from savings of income, 1913.....		636.94
Bequest of William Jones Rhees, 1913.....		251.95
Deposit of proceeds from sale of real estate (gift of Robert Stan- ton Avery), 1913.....		9,602.42
Bequest of Addison T. Reid, 1914.....		4,795.91
Deposit of savings from income Avery bequest, 1914.....		204.09
Total of fund deposited in the United States Treasury.....		960,500.00

OTHER RESOURCES.

Registered and guaranteed bonds of the West Shore Railroad Co., part of legacy of Thomas G. Hodgkins (par value).....	42,000.00
Total permanent fund.....	1,002,500.00

With the aid of the first installment of \$4,795.91 of a bequest from the late Addison T. Reid and a small deposit from savings of income from the Avery bequest, the permanent fund now, for the first time, exceeds \$1,000,000.

That part of the fund deposited in the Treasury of the United States bears interest at 6 per cent per annum, under the provisions of the act organizing the Institution and an act of Congress approved March 12, 1894. The rate of interest on the West Shore Railroad bonds is 4 per cent per annum.

The income of the Institution during the year, amounting to \$90,982.54, was derived as follows: Interest on the permanent foundation, \$58,994.29; contributions from various sources for specific purposes, \$17,554.20; first installment of a bequest from the late Addison T. Reid, \$4,795.91; and from other miscellaneous sources, \$9,638.14; all of which was deposited in the Treasury of the United States.

With the balance of \$33,641.40 on July 1, 1913, the total resources for the fiscal year amounted to \$124,623.94. The disbursements which are given in detail in the annual report of the executive committee, amounted to \$94,063.81, leaving a balance of \$30,560.13 on deposit June 30, 1914, in the United States Treasury and in cash.

The Institution was charged by Congress with the disbursement of the following appropriations for the year ending June 30, 1914:

International exchanges.....	\$32,000
American Ethnology.....	42,000
Astrophysical Observatory.....	13,000

National Museum:

Furniture and fixtures.....	\$50,000
Heating and lighting.....	50,000
Preservation of collections.....	300,000
Books.....	2,000
Postage.....	500
Building repairs.....	10,000
Bookstacks for Government bureau libraries.....	15,000
National Zoological Park.....	100,000
Readjustment of boundaries, National Zoological Park.....	107,200
International Catalogue of Scientific Literature.....	7,500
Total.....	729,200

In addition to the above specific amounts to be disbursed by the Institution, there was included under the general appropriation for public printing and binding an allotment of \$76,200 to cover the cost of printing and binding the annual report and other Government publications issued by the Institution, and to be disbursed by the Public Printer.

RESEARCHES AND EXPLORATIONS.

During the past year the Institution has continued to carry on investigations in various lines throughout the world by means of small allotments from its funds. It has also accomplished a great deal in the way of exploration and research through the generosity of friends of the Institution, who have contributed funds for special work or provided opportunities for participation in explorations which they had undertaken personally or through the aid of others. Each year, however, the Institution is obliged to forego opportunities for important investigations through lack of sufficient funds.

I can here only briefly mention some of the work in progress under the Smithsonian Institution proper during the past year, while accounts of activities connected with the Astrophysical Observatory, the Bureau of American Ethnology, and the United States National Museum are given in other parts of this report by those in direct charge of those branches of the Institution.

THE LANGLEY AERODYNAMICAL LABORATORY.

By resolution of the Regents on May 1, 1913, the secretary was authorized to reopen the Smithsonian Institution laboratory for the study of aerodynamics and to be known as the Langley Aerodynamical Laboratory. The functions of the laboratory were defined to be the study of the problems of aerodynamics, particularly those of aerodynamics, with such research and experimentation as may be necessary to increase the safety and effectiveness of aerial locomotion for the purposes of commerce, national defense, and the welfare of man.



LANGLEY MAN-CARRYING AERODROME (BUILT 1898-1903) EQUIPPED WITH FLOATS, IN FLIGHT OVER LAKE KEUKA, HAMMONDSPORT, N. Y.,
JUNE 2, 1914.



LANGLEY MAN-CARRYING AERODROME (BUILT 1898-1903) EQUIPPED WITH FLOATS, IN FLIGHT OVER LAKE KEUKA, HAMMONDSPORT, N. Y.,
JUNE 2, 1914.

The Regents also authorized the secretary to appoint an advisory committee; to add, as means are provided, other laboratories and agencies; to group them into a bureau organization; and to secure the cooperation with them of the Government and other agencies.

In accordance with the above general plan an advisory committee was organized at a meeting convened at the Institution on May 23, 1913. The official status, organization, agencies, resources, and facilities of this committee were set forth in a statement in my last report.

The first year's work of the laboratory was to arrange a comprehensive program of operations, devise ways and means of carrying on investigations and publishing reports, conduct such active experiments as were possible with the means immediately available, and to secure and arrange in the library the best aeronautical literature.

The reports of the committee thus far published have appeared as individual papers in the Smithsonian Miscellaneous Collections. The first of these recounts the organization of the advisory committee and the resources of the Langley laboratory. The first technical publication sets forth the results of experiments made at the model tank at the Washington Navy Yard. Another report describes the organization and equipment of the leading aeronautical laboratories of England, France, and Germany. Some of the reports of the committee are as yet confidential or incomplete. The library has been furnished with the chief aeronautic periodicals and the best books thus far published.

The rehabilitation and successful launching of the Langley aeroplane (called "aerodrome" by Prof. Langley), constructed over a decade ago, was accomplished in May, 1914. The machine was shipped from the Langley laboratory to the Curtiss aeroplane factory in April. It was recanvassed and provided with hydroaeroplane floats, and was launched on Lake Keuka on May 28. With Mr. Glenn H. Curtiss as pilot it ran easily over the water, rose on level wing, and flew in steady poise 150 feet. Subsequent short flights were made in order to secure photographs of the craft in the air. Then Mr. Curtiss was authorized, in order to make prolonged flights without overtaxing the bearings of the Langley propulsion fixtures, to install in its place a standard Curtiss motor and propeller. At the close of the fiscal year the experiments were still making satisfactory progress.

The tests thus far made have shown that the late Secretary Langley had succeeded in building the first aeroplane capable of sustained free flight with a man. It is hoped that further trials will disclose the advantages of the Langley type of machine. It may be recalled that this man-carrying aeroplane was begun in 1898 for the War

Department, and in the interest of the national defense. It was built on the design of the model machine which, on May 6, 1896, first demonstrated to the world that an aeroplane heavier than air could be propelled through the air by its own power. The large machine was completed in 1903, but its actual flight was at that time hindered by injuries sustained through defects in the launching apparatus.

The numerous and comprehensive aerotechnical investigations planned for the Langley laboratory can be successfully carried out only when increased funds are available. Properly equipped and endowed, the laboratory would serve as a national aeronautical institute suitable for conducting the aerotechnical investigations and tests required by the Government and the aeronautical industries of this country.

GEOLOGICAL EXPLORATIONS IN THE CANADIAN ROCKIES.

In continuation of my previous geological researches in the Canadian Rockies, I revisited during the field season of 1913 the Robson Peak district, in British Columbia and Alberta, and the region about Field, British Columbia. At the latter place I met the members of the International Geological Congress.

On this trip Robson Peak was approached from the west side in order to study the local geological section, one of the finest in the world. From the west foot of Robson Peak, Whitehorn Peak rises on the north to a height of 7,850 feet above Lake Kinney, and on the east the cliffs of Robson rise tier above tier from the surface of the lake to the summit of the peak, a vertical distance of 9,800 feet.

From beneath the base of the mountain at Lake Kinney the strata curve gently outward, so that upwards of 4,000 feet in thickness of beds that are beneath Robson Peak are exposed in their extension to the west and south.

Owing to exceptionally good climatic conditions the season of 1913 proved unusually favorable for studying Robson Peak. Frequently in the early morning the details of the snow slopes and bedded rocks on the summit of the peak were beautifully outlined, but toward evening the mists, driven in from the warm currents of the Pacific, 300 miles away, shrouded the mountain from view.

From the west slopes of Titkana Peak, east of the great Hunga Glacier, a wonderful view is obtained of the snow fields and falling glaciers east and north of Robson Peak. The glacial streams come tumbling down the slopes and often disappear beneath the glacier to reappear at its foot with the volume of a river.

At Field, British Columbia, work was continued at the great middle Cambrian fossil quarry, where a large collection of specimens

was secured. It was necessary to do much heavy blasting to reach the finest fossils which occur in the lower layers of rock.

The collection of 1918 contains a number of very important additions to this ancient fauna and many fine specimens of species found in 1912. A report on these collections is now in preparation.

An illustrated account of my previous exploration in the Robson Peak district was published in the Smithsonian Miscellaneous Collections, Vol. 57, No. 12, and a paper with panoramic view, entitled "The Monarch of the Canadian Rockies," appeared in the National Geographic Magazine, May, 1913. Three other reports of my studies were published in the Smithsonian Miscellaneous Collections, entitled "New Lower Cambrian Subfauna," "*Dikelocephalus* and other genera of the *Dikelocephalinae*," and "The Cambrian Faunas of Eastern Asia." A report on "The Cambrian and its Problems in the Cordilleran Region" is now in press in a new volume of the Dana commemorative course at Yale University. The investigations discussed in this paper were continued in a report, "Pre-Cambrian Algonkian Algal Flora," in the Smithsonian Miscellaneous Collections, and preparations were made for further study of the subject in the Rocky Mountains of Montana during the field season of 1914. This was successfully carried out with the acquisition of several tons of specimens.

GEOLOGIC HISTORY OF THE APPALACHIAN VALLEY IN MARYLAND.

Dr. R. S. Bassler, of the National Museum, spent a month during the summer of 1913 in the Appalachian Valley of Maryland and the adjoining States, studying the postpaleozoic geologic history of the region, as indicated by the present surface features. His studies, which were under the joint auspices of the United States National Museum and the Maryland Geological Survey, were in continuation of work carried on during the previous summer, when the sedimentary rocks of the region were mapped in detail.

Since Carboniferous times western Maryland has been above the sea, and its rocks have accordingly been subjected to a long period of aerial erosion. During Jurassic time the area remained stationary for so long a period that the surface of the land in the Appalachian province was reduced to a rolling plain. Later uplift raised this plain still higher above sea level, and in Maryland only remnants of the old surface are preserved in the flat sky line of the highest mountains. This ancient plain, or Schooley peneplain, as it is termed, is well preserved on the top of the Blue Ridge.

A second great period of erosion occurred in early Tertiary times, the effects of which were chiefly in the Appalachian Valley proper, where the erosion is indicated by a pronounced plain at an elevation

of about 750 feet. This plain was formed only on the softer Paleozoic rocks, and, because of its prominence near Harrisburg, Pa., is known as the Harrisburg peneplain. Conococheague Creek traverses the Harrisburg peneplain in Maryland, and has dissected it considerably, but the even sky line of the ancient plain is still clearly evident.

Other factors in the geologic history of Maryland are recorded in the well-defined gravel terraces along the major streams of the area and in great alluvial fans of large and small boulders, spreading out at the foot of the larger mountains and sometimes reaching a depth of 150 feet.

PLEISTOCENE CAVE DEPOSIT IN MARYLAND.

As the results of a further examination of the Pleistocene cave deposit near Cumberland, Md., by Mr. J. W. Gidley, of the National Museum, many new forms were added to the collection, and much better material obtained of several species represented only by fragments of jaws in the first collection. The series now includes more than 300 specimens, representing at least 40 distinct species of mammals, many of which are extinct. Among the better preserved specimens are several nearly complete skulls and lower jaws. The more important animals represented are two species of bears, two species of a large extinct peccary, a wolverine, a badger, a martin, two porcupines, a woodchuck, and the American elandlike antelope.

Other species represented by more fragmentary material include the mastodon, tapir, horse, and beaver, besides several species of the smaller rodents, shrews, bats, and others.

This strange assemblage of fossil remains occurs hopelessly intermingled and comparatively thickly scattered through a more or less unevenly hardened mass of cave clays and breccias, which completely filled one or more small chambers of a limestone cave, the material, together with the bones, evidently having come to their final resting place through an ancient opening at the surface a hundred feet or more above their present location. The deposit is exposed at the bottom of a deep railroad cut which first brought to light this ancient bone deposit and incidentally made access to the fossils comparatively easy.

GEOLOGICAL SURVEY OF PANAMA.

A statement was made in my report for last year that an allotment had been made from the Institution's funds toward the expenses of an investigation of the geology of Panama. This work is in progress under the joint auspices of the Isthmian Canal Commission, the United States Geological Survey, and the Smithsonian Institution. The general plan includes a systematic study of the physiography, stratigraphy and structural geology, geologic history, geologic correlation, mineral resources (including coal, oil, and other

fields), petrography and paleontology of the Canal Zone, and of as much of the adjacent areas of the Isthmian region as is feasible.

Upon the completion of the work the Institution will print a general account of the results, and later there will be published a detailed report of the geological data of the Isthmus and adjoining regions.

VERTEBRATE FOSSIL REMAINS IN MONTANA.

During the summer of 1913 Mr. Charles W. Gilmore, of the National Museum, headed an expedition for the purpose of obtaining a representative collection from northwestern Montana.

A camp was established on Milk River, on the Blackfeet Indian Reservation, and four weeks were spent there in collecting, the work being confined entirely to the Upper Cretaceous (Belly River beds) as exposed in the bad lands for 10 miles along this stream. The camp was then moved some 50 miles south on the Two Medicine River, and two weeks were spent working in the same geological formation. Between 500 and 600 separate fossil bones were obtained, many of them of large size. The most notable discovery was a new Ceratopsian or horned dinosaur, the smallest of its kind known. There were portions of five individuals of this animal recovered, representing nearly all parts of the skeleton, making it possible to mount a composite skeleton for exhibition. Although Ceratopsian fossils were first discovered in the Rocky Mountain region in 1855, and portions of a hundred or more skeletons have been collected, this is the first individual to be found having a complete articulated tail and hind foot. It thus contributes greatly to our knowledge of the skeletal anatomy of this interesting group of extinct reptiles.

Another find was a partial skeleton of one of the Trachodont or duck-billed dinosaurs recently described from specimens obtained in Canada, and its discovery in Montana greatly extends its known geographical and geological range. Less perfect skeletons of carnivorous and armored dinosaurs, turtles, crocodiles, and ganoid fishes were also obtained.

FOSSIL ECHINODERMS IN ILLINOIS.

The special field explorations maintained by Mr. Frank Springer, associate in paleontology in the United States National Museum, were continued during the season of 1913 by his private collector, Frederick Braun. The purpose of these explorations is to obtain additional material for use in Mr. Springer's monographs upon the fossil crinoidea, now in course of preparation, but they also result in important accessions of excellent specimens for the completion of the exhibition series in the halls of Invertebrate Paleontology in the National Museum.

The investigations of the past summer were confined to the Kaskaskia rocks of Monroe and Randolph Counties, Ill. They were systematically carried on in connection with the geological work for the State of Illinois, in progress at the same time under the direction of Prof. Weller, in order to have the benefit of accurate determinations of the horizons from which the collections were made, with reference to the several subordinate formations into which the Kaskaskia of that region is divided. In this way it was hoped to correct some confusion as to the stratigraphic relation of a number of species described in the geological reports of Illinois and Iowa. The operations were successful in this respect, and at the same time six large boxes of fine specimens were obtained. Among the specimens there are a number of slabs covered with crinoids not hitherto found in that formation in an excellent state of preservation, a portion of one slab containing 22 specimens of 9 different species.

MOLLUSCAN FAUNA OF VIRGINIA COAST.

Mr. John B. Henderson, jr., a member of the Board of Regents of the Institution, and Dr. Bartsch, of the National Museum, visited the Atlantic shore of Accomac County, Va., which had heretofore received little attention from collectors.

The chief objects of this trip were to determine of just what elements the molluscan fauna consisted; to see how many, if any, species of southern range lapped over from Hatteras, and what northern species still persisted in this faunal area. The collectors were fortunate in their somewhat haphazard choice of a locality, for they encountered at Chincoteague a greater variety of stations than can probably be found at any other point along this section of the coast. Here there are interior sounds of very considerable extent which are very shallow (4 to 12 feet), more or less thickly sown with oyster beds and with patches of eel grass, the bottom ranging from hard sand through varying degrees of hard clay to soft mud.

They found also the unusual feature of a bight or protected cove formed by the southward drift at the southern end of Assateague Island, protected from heavy wave action by a long, curved sand spit. This bight has a soft mud bottom, with a temperature possibly 8° less than that of the open sea. The mud brought up with the dredge seemed almost icy to the touch. This condition is probably produced by cold springs seeping through the floor of the bight. This colder water of the bight yielded to their dredge *Yoldia limatula*, large and fine, and *Nucula proxima*, whereas just around the protective spit of sand, on the ocean side, they found dead *Terebras*

of two species, some young *Busycon perversa*, and a valve of *Cardium robustum*—a somewhat startling association of species.

Then there was the open sea, which here presumably differs in no manner from other open-sea stations along the 200 miles or more of this coast. The bottom drops off very gradually to the edge of the continental shelf, some 75 or 100 miles out. The open-sea stations which they occupied were, as might be expected, very poor. The smooth, hard sand bottom seemed almost barren of life, and the softer patches that were explored contained only many dead shells, mostly small bivalves. The work in the open sea was scarcely a good test, although they made probably 20 hauls, reaching out from the shore some 4 or 5 miles, but the chart soundings indicated more promising areas of pebbly bottom a few miles beyond what they considered the safety zone for a small motor boat.

The inner waters of the sound were found to be unexpectedly rich in molluscan life, the species, for the most part, not having been taken outside or in the bight.

EXPEDITION TO DUTCH EAST BORNEO AND CASHMERE.

In continuation of the exploration and collection carried on through the generosity of Dr. W. L. Abbott, by Mr. H. C. Raven, in Dutch East Borneo it may be said that the work is going forward with excellent results. Dr. Abbott is continuing his personal explorations in Cashmere and has forwarded some valuable specimens of mammals, including a queer little silvery gray shrew about 74 millimeters long, and a magnificent snow leopard, with its complete skeleton. In Baltistan, northwestern Cashmere, Dr. Abbott secured about 289 skins, which have been presented to the National Museum. After a sojourn in England he expected to return to Cashmere and march to Ladak. He also intended to visit Nubra and go east along the frontier to the Dipsang Plains, where he hoped to secure specimens of a certain vole from Kara Korum Pass, as well as the little Tibetan fox, known to the Cashmere furriers as the "king fox."

LIFE ZONES IN THE ALPS.

Aided by a small grant from the funds of the Institution, Dr. Stejneger, head curator of biology in the National Museum, visited the eastern Alps toward the close of the last fiscal year, to make further observations toward a determination of the limits of the life zones, which in that part of Europe might correspond to those established in North America. That a system of such life zones exists in Europe has long been more or less vaguely stated by authors, but although a definite correlation was established by Dr. Stejneger and Mr. Miller in 1904, certain points, especially the interrelation of

the zones corresponding to the so-called Canadian and Hudsonian life zones in America, were greatly obscured by the long-continued interference of man and animals with nature, such as the grazing of cattle in the high Alps, deforestation, and more recently, artificial reforestation.

It was thought that the eastern Alps might show more primitive conditions. Dr. Stejneger visited the mountain region between Switzerland and the head of the Adriatic. Arrived at the town of Bassano, at the foot of the Venetian Alps, he began to study the life zones of the Val Sugana and the plateau of the Sette Comuni from that point. This plateau descends abruptly to the Venetian plain on the south, while to the east and north it is separated from the mass of the eastern Alps by the Val Sugana, or the valley of the River Brenta, and on the west by the lower part of the valley of the Adige, or Etsch. It is intersected by the boundary line between Italy and Austrian Tyrol.

He made a series of excursions from Bassano, Levico, and Trento as successive headquarters, during which time he completely circled the territory, and crossed the plateau once on foot. He was able to trace the boundaries of the Austral life zones in considerable detail, as well as to gather data which connect with the previous correlation of these zones in the western Alps and with the corresponding zones in North America. It was found that the bottom of the entire Val Sugana belongs to the upper Austral zone. Owing to the rainy and inclement weather the results were less satisfactory in the higher regions, though some important data corroborating previous conclusions were obtained.

Observations were also made on the Etsch Valley in Tyrol, from Trento to Schlanders, and on its tributary, the Eisak, from Bozen to its source on the Brenner Pass.

The elaboration of the detailed observations will be incorporated with a general report on the biological reconnoissance of the western Alps.

RESEARCHES UNDER HARRIMAN TRUST FUND.

Dr. C. Hart Merriam continued during the year to carry on certain natural history and ethnological investigations provided for by a special trust fund established by Mrs. E. H. Harriman for that purpose. His principal work during the year was on the big bears of America, a group he has been studying for more than 20 years and concerning which he now has a monograph in preparation. In furtherance of this study, specimens have been placed at his disposal by numerous sportsmen and hunters and by the larger museums of the United States and Canada. In the course of his investigations a transcontinental line was run across the country to the coast of California by which the easternmost limits of range were determined for

a number of species of mammals, birds, reptiles, and plants. And while traversing Utah and Nevada several remote tribes of Indians were visited, particularly the Gosinte, from whom a long-needed vocabulary was obtained.

ANTHROPOLOGICAL RESEARCH IN EASTERN ASIA.

For the extension of researches in eastern Asia, in continuation of anthropological investigations carried on in Siberia and Mongolia under the direction of the Institution in 1912, an allotment has been made from the Smithsonian fund for work during the next fiscal year and for a limited period thereafter. The plan of operations includes a thorough study of the peoples of the eastern coast of Asia, Manchuria, Mongolia, Tibet, and Siberia, among whom it is believed lies the secret of the origin of the American Indian. Investigations thus far made by Dr. Hrdlička in behalf of the Institution indicate, he says, "that there exist to-day over large parts of eastern Siberia and in Mongolia, Tibet, and other regions in that part of the world numerous remains which now form constituent parts of more modern tribes or nations, of a more ancient population (related in origin, perhaps, with the latest paleolithic European), which were physically identical with, and in all probability gave rise to, the American Indian."

In a pamphlet on Smithsonian Explorations in 1913 a number of other biological and anthropological investigations are described.

RESEARCHES UNDER THE HODGKINS FUND.

The Hodgkins fund was established in 1891 by a gift of \$200,000 from Mr. Thomas George Hodgkins, of Setauket, N. Y. By subsequent gifts during his life and through sums received from Mr. Hodgkins's estate, of which the Institution was made the residuary legatee, the fund has increased to about \$250,000. It was stipulated by the donor that the income of \$100,000 of his gift should be devoted to the increase and diffusion of more exact knowledge in regard to the nature and properties of atmospheric air in connection with the welfare of man. He indicated his desire that researches be not limited to sanitary science, but that the atmosphere be considered in its widest relationship to all branches of science, referring to the experiments of Franklin in atmospheric electricity and the discovery of Paul Bert in regard to the influence of oxygen on the phenomena of vitality as germane to his foundation. To stimulate researches in these directions the Institution offered a prize of \$10,000 for a paper embodying some new and important discovery in regard to the nature and properties of atmospheric air, which was awarded in 1895 to Lord Rayleigh and Prof. William Ramsay, of London, for

the discovery of argon, a new element in the atmosphere. Another prize of \$1,000 for the best popular treatise on atmospheric air was awarded to Dr. Henry de Varigny, of Paris, from among 229 competitors in the United States, France, Germany, England, Scotland, Ireland, Italy, Russia, Austria-Hungary, Norway, Denmark, Finland, Bohemia, Bavaria, Servia, Switzerland, Spain, India, Canada, Mexico, and Argentina. Numerous investigations on the "composition of expired air and its effects upon animal life," in "atmospheric actinometry," the "air of towns," "animal resistance to disease," "experiments with ionized air," "the ratio of specific heats," and kindred topics have been carried on with the aid of grants from the Hodgkins fund. Researches have likewise been aided in connection with the temperature, pressure, radiation, and other features of the atmosphere at very high altitudes, extending during the past year to more than 45,000 feet, and many other lines of investigation have been carried on, through all of which it is believed that valuable knowledge has been acquired by which the welfare of man has been advanced.

Under a grant from the Hodgkins fund Mr. A. K. Ångström carried on some observations in California during the past year for the purpose of measuring nocturnal radiations at different altitudes ranging from below sea level to the summit of Mount Whitney, 4,420 meters (14,502 feet). Some of the results attained by Mr. Ångström and work in connection therewith are discussed by Dr. C. G. Abbot in his report as director of the Astrophysical Observatory.

A grant was also made to Mr. Ångström to enable him to measure the "nocturnal radiation"—that is, loss of heat to space during the total eclipse of the sun August 21, 1914, in the north of Sweden.

In connection with the International Congress on Tuberculosis held in the National Museum in 1908 the Institution offered a Hodgkins fund prize of \$1,500 for the best treatise on "the relation of atmospheric air to tuberculosis." About a hundred papers were submitted, and after an exhaustive examination by the advisory committee the award has now been made and the prize divided equally between Dr. Guy Hinsdale, of Hot Springs, Va., and Dr. S. Adolphus Knopf, of New York, for their essays on the topic stated.

Dr. Hinsdale's essay was recently published at the expense of the Hodgkins fund, the public demand for the work requiring the printing of a second edition. In discussing the general treatment of the disease, the essayist has special reference to the effect of the atmospheric air and the value of various climates in relation to tuberculosis. In conclusion the author says:

We believe that climate may be utilized as an adjuvant of great value for carrying out the hygienic, dietetic treatment of all forms of tuberculosis and many other diseases. * * * The first place must be assigned to an abundance

of air, which is as nearly as possible bacteriologically and chemically pure.
* * * Only at the sea or at the highest elevations do we find air really pure, but we can approximate it by living out of doors.

* * * Probably the best combination is a low humidity and a moderately cool temperature; the average tuberculosis patient makes his best gains after August 1 and in subsequent cold, dry weather when such conditions prevail. * * *

The old idea about equability of temperature, at least between the temperature of midday and midnight, is not of great importance; all mountainous stations show great variations in this respect. Some variability tends to stimulate the vital activities, but in older people and those who are feeble great variability is a disadvantage.

As far as altitude is concerned it probably has not, per se, any great influence; certainly, to my mind, not so much as we used to think. However, altitude is incidentally associated with mountain life or life on the plains, with more sun, less moisture, and scattered population.

* * * Surgical tuberculosis is always favorably influenced by a seashore residence suitably chosen. * * * Constant outdoor life in all weather works miraculous cures after the most formidable operations for bone tuberculosis, and in many cases renders them wholly unnecessary in patients whose physical condition on admission was most unpromising.

SMITHSONIAN TABLE AT NAPLES ZOOLOGICAL STATION.

In the interest of American biologists who may desire to study marine life under exceptionally favorable facilities, the Institution has for more than 20 years maintained a table at the Naples Zoological Station. Investigators are assigned the use of this table for stated periods on the recommendation of an advisory committee appointed for the purpose. During the past year the table has been utilized by Mr. Reynold A. Spaeth, a student of Harvard University, who pursued studies in experimental physiology; Dr. T. S. Painter, graduate of Yale University, for work on an experimental cytological problem; and Prof. Edwin C. Starks, of Stanford University, for an investigation of the bones and muscles of the mandible of fishes.

RESEARCH CORPORATION.

In February, 1912, the Research Corporation was organized under the laws of New York as a means for furthering scientific and technical research. Its principal object is—

to acquire inventions and patents and to make them more available in the arts and industries, while using them as a source of income, and, second, to apply all profits derived from such use to the advancement of technical and scientific investigation and experimentation through the agency of the Smithsonian Institution and such other scientific and educational institutions and societies as may be selected by the directors.

No dividends are to be paid, and the entire net profits are to be devoted to research. The Smithsonian Institution is interested in

the management of this corporation through the membership of the secretary in its board of directors, which is composed of business and professional men, many of whom have had experience in large industrial and mining enterprises, and it is provided in the certificate of incorporation that the Smithsonian Institution may receive funds for research and experimentation.

The chief assets of the corporation at present are the Cottrell patents relating to the precipitation of dust, smoke, and chemical fumes by the use of electrical currents. Dr. F. G. Cottrell, the inventor and donor of these patents, has described their operation and advantages and the progress thus far made in their installation in an article printed in the Smithsonian Report for 1913.

A number of other patents in various fields of industry have been offered by officers of the Government and scientific institutions, as well as by manufacturing corporations holding patents not available for their own purposes, and undoubtedly there are many others, both in this country and abroad, who will be glad to have their inventions utilized for the benefit of scientific research.

AMERICAN SCHOOL OF ARCHEOLOGY IN CHINA.

In my last report mention was made of the proposed establishment of an American school of archeology in China. The objects of the school as proposed are: (1) To prosecute archeological research in eastern China; (2) to afford opportunity and facilities for investigation to promising and exceptional students, both foreign and native, in Asiatic archeology; and (3) to preserve objects of archeological and cultural interest in museums in the countries to which they pertain in cooperation with existing organizations, such as the Société d'Ankor, etc.

The management of the affairs of the school is placed in the hands of an executive committee of five, consisting of Dr. Charles D. Walcott, Secretary of the Smithsonian Institution; Mr. Charles Henry Butler, reporter of the United States Supreme Court; Prof. E. W. Shipley, of St. Louis; Mr. Charles L. Freer, of Detroit; and Mr. Eugene Meyer, jr., of New York. The general committee consists of 16 gentlemen especially interested in archeological research in China, with Dr. Walcott as chairman and Mr. Butler as secretary. A preliminary survey in the Chinese Republic for the information of the general committee in considering the permanent organization of the proposed school has been made, and the committee will later be called together for further consultation.

PUBLICATIONS.

Of new publications there was issued by the Smithsonian Institution and its branches during the year a total of 6,807 printed pages,

with 834 plates of illustrations. The aggregate distribution was 202,671 copies of pamphlets and bound volumes.

One of the principal functions of the Institution, "the diffusion of knowledge," is accomplished through its publications, which record results of original researches, accounts of explorations, the progress achieved in science and industry, and general information in all branches of human knowledge believed to be of value to those interested in the promotion of science and in the welfare of man. The series of "Contributions to Knowledge" in quarto form, and the "Miscellaneous Collections," in octavo, are printed in limited editions at the expense of the Institution and distributed chiefly to certain large libraries throughout the world where they are available for public reference. The Annual Report, however, is provided for by congressional appropriations, and the edition is great enough to permit its wide distribution. Besides the official report of the Board of Regents and the secretary of the general operations of the Institution during the year, there is included in the Smithsonian Report a general appendix containing 30 or more original or selected papers illustrating the more remarkable and important developments in scientific discovery.

In addition to the three series of works above mentioned pertaining to the Institution proper, there are issued under its direction (*a*) the Annual Report, the Proceedings, and the Bulletins of the National Museum, including the Contributions from the National Herbarium; (*b*) the Annual Report and Bulletins of the Bureau of American Ethnology; and (*c*) the Annals of the Astrophysical Observatory, all of which are public documents printed through annual allotments by act of Congress.

Smithsonian Contributions to Knowledge.—The chief characteristic of memoirs contained in the Contributions to Knowledge is that they are discussions of extensive original investigations constituting important additions to knowledge. Since the establishment of this series in 1848 there have been published about 150 of these memoirs in 35 quarto volumes. The most recent of these, reviewed in my last report, was the "Langley Memoir on Mechanical Flight," recording the experiments of the late Secretary Langley, resulting in his successful demonstration of the practicability of aerial navigation with machines heavier than the air.

Smithsonian Miscellaneous Collections.—Thirty-six papers in this series were issued during the year, forming parts of seven volumes, as enumerated in Appendix 8. They included some articles by your secretary, describing further results of his studies of Cambrian fossils, and papers on the usual wide range of biological, geological, and anthropological topics. In this series are included the Smithsonian tables, which have become standard works of reference.

In 1852 the Institution published the first edition of the Smithsonian meteorological tables, which were so widely used by physicists during the next 40 years that it was decided to publish three sets of tables, independent of one another, but forming a homogenous series. The first of the new series, Smithsonian Meteorological Tables, was published in 1893; revised editions were issued in 1896, 1897, and 1907, and another revised edition is now under consideration. The second series, Smithsonian Geographical Tables, appeared in 1894, editions slightly revised were issued in 1897 and 1906, and additional copies of the last edition were printed during the past year to meet the constant demand for this work. In 1896 there was published the Smithsonian Physical Tables, which have passed through several editions, the sixth revised edition being now in press. In this latest edition are incorporated many new tables and the insertion of recent data in the older tables to conform with the great advances in various fields of physical science. A fourth series is the Smithsonian Mathematical Tables (Hyperbolic Functions), published in 1909.

Smithsonian Report.—The distribution of the Annual Report for 1912 was long delayed, awaiting a supply of the quality of paper used in that publication. The volume contains 38 articles of the usual character in the general appendix. The report for 1913 was in type at the close of the fiscal year. The popularity of this publication continues unabated, the entire edition each year becoming exhausted very soon after its completion.

Special publications.—For several years past the Institution has issued in printed form the Opinions rendered by the International Commission on Zoological Nomenclature. During the past year Opinions 57 to 65 were thus published. To aid the work of this commission the Institution also provides for clerical services in connection with the office of its secretary in this country.

Another special publication of the year, printed in a limited edition, was a pamphlet giving an account of the exercises in the Smithsonian building on May 6, 1913, on the occasion of the presentation of the Langley medal to Monsieur Eiffel and to Mr. Glenn H. Curtiss, and the unveiling of the Langley memorial tablet.

Harriman Alaska Series.—In 1910 there was transferred to the Smithsonian Institution by Mrs. Edward H. Harriman the remainder of the edition of volumes 1 to 5 and 8 to 13 of the elaborate publication on the results of the Harriman Alaska Expedition of 1899. It may be recalled that this expedition was organized with the cooperation of the Washington Academy of Sciences, but entirely at the expense of the late Mr. Edward H. Harriman, of New York. It was participated in by a large party of scientific specialists, on a steamship specially chartered for the purpose. A narrative of the trip and observations on the regions visited, together with descrip-

tions of the natural-history features of Alaska were prepared by specialists of the party and published in the series above mentioned. Volumes 6 and 7 on botany are still in preparation. During the past year volume 14 has been issued by the Smithsonian Institution. It is a monograph of the shallow-water starfishes of the North Pacific coast, from the Arctic Ocean to California, and is accompanied by 110 plates of illustrations.

National Museum publications.—The annual report for 1914 of the assistant secretary in charge of the National Museum was published during the year, together with 49 papers from the Museum Proceedings, and 9 Bulletins, including a number of parts of volumes of Contributions from the National Herbarium.

Ethnology publications.—The Bureau of American Ethnology issued during the year a bulletin on Chippewa Music and one on the Ethnozoology of the Tewa Indians. There were in press at the close of the year three annual reports and several bulletins, as noted in the second appendix of this report.

Astrophysical Observatory.—Volume 3 of the Annals of the Astrophysical Observatory was distributed early in the fiscal year.

Reports of historical and patriotic societies.—In accordance with the national charters of the American Historical Association and the National Society of the Daughters of the American Revolution, annual reports of those organizations were submitted to the Institution and communicated to Congress.

Allotments for printing.—The allotments to the Institution and its branches, under the head of "Public printing and binding," during the fiscal year, aggregating \$76,200, were all utilized, with the exception of small balances on work in progress at the close of the year. The allotments for the year ending June 30, 1915, are as follows:

For the Smithsonian Institution: For printing and binding the annual reports of the Board of Regents, with general appendices.....	\$10,000
For the annual reports of the National Museum, with general appendices, and for printing labels and blanks, and for the Bulletins and Proceedings of the National Museum, the editions of which shall not exceed 4,000 copies, and binding, in half morocco or material not more expensive, scientific books, and pamphlets presented to or acquired by the National Museum library.....	37,500
For the annual reports and Bulletins of the Bureau of American Ethnology and for miscellaneous printing and binding for the bureau....	21,000
For miscellaneous printing and binding:	
International Exchanges.....	200
International Catalogue of Scientific Literature.....	100
National Zoological Park.....	200
Astrophysical Observatory.....	200
For the annual report of the American Historical Association.....	7,000
Total.....	76,200

Committee on printing and publication.—The advisory committee on printing and publication under the Smithsonian Institution has continued to examine manuscripts proposed for publication by the branches of the institution and has considered various questions concerning public printing and binding. Twenty meetings of the committee were held during the year and 121 manuscripts were passed upon. The personnel of the committee during the year was as follows: Dr. Frederick W. True, Assistant Secretary of the Smithsonian Institution, chairman; Dr. C. G. Abbot, Director of the Astrophysical Observatory; Dr. Frank Baker, Superintendent of the National Zoological Park; Mr. A. Howard Clark, editor of the Smithsonian Institution, secretary of the committee; Mr. F. W. Hodge, Ethnologist-in-charge of the Bureau of American Ethnology; Dr. George P. Merrill, head curator of geology, United States National Museum; and Dr. Leonhard Stejneger, head curator of biology, United States National Museum.

Distribution of publications.—In accordance with the law enacted August 23, 1912, requiring that all Government publications be mailed from the Government Printing Office, the Smithsonian Report and publications of the United States National Museum and the Bureau of American Ethnology have since been distributed direct from the Government Printing Office.

LIBRARY.

The library of the Smithsonian Institution is its most valuable single possession. The number of publications of learned societies and of periodicals and other works pertaining to pure and applied science which have been brought together by the Institution since its organization aggregates more than half a million titles. In 1866 many of the scientific works in the library were transferred for various administrative reasons to the Library of Congress, where they form the Smithsonian deposit, which is constantly being increased by new accessions. The number of additions to the deposit during the past year was 32,195 pieces, including 20,603 periodicals, 3,765 volumes, 1,729 parts of volumes, 5,755 pamphlets, and 343 charts.

In the Smithsonian and Museum buildings there are retained such books of the Smithsonian Library as are needed for reference in scientific investigations, and there is maintained a reading room, where the current numbers of nearly 300 foreign and domestic scientific periodicals are on file for consultation by students in general and by the staff of the Institution and its branches.

In the main hall of the Smithsonian building steel stacks are being constructed for the better care and preservation of the libraries of the Government bureaus under the Institution.

Works on natural history, the arts and industries, and other subjects pertaining to the several departments of the National Museum are installed in the new and older Museum buildings. This library now numbers 43,609 volumes, 73,761 pamphlets and unbound papers, and 124 manuscripts.

In the assistant librarian's review of the year's operations in appendix 6 of this report details will be found as to the work of the library in its several subdivisions.

INTERNATIONAL CONGRESSES.

The Institution is frequently invited to send representatives to scientific congresses in the United States and abroad, but as funds are not available for the expenses of delegates, invitations can be accepted only in a few instances when collaborators of the Institution or members of the scientific staff are willing to attend at their own expense.

Your secretary, as a member of the Twelfth International Congress of Geology, would have attended the meeting in Toronto August 7 to 14, 1913, but he was unable to make arrangements to leave his field work in the Canadian Rockies at that time. He had an opportunity to address the members of the congress during their visit to Field, British Columbia. Dr. George P. Merrill, head curator of geology in the United States National Museum, however, attended the congress as representative of the Smithsonian Institution and the Museum.

Plans had been perfected at the close of the fiscal year for holding the Nineteenth International Congress of Americanists in Washington during the month of September, 1914.

GEORGE WASHINGTON MEMORIAL BUILDING.

In my last report reference was made to the act of Congress approved by the President March 4, 1913, authorizing the George Washington Memorial Association to erect a memorial building on Armory Square facing the Mall, which extends from the Capitol to the Washington Monument. The control and administration of the building, when erected, is in the Board of Regents of the Smithsonian Institution. Plans for the building were selected in May, 1914, from designs submitted by 13 competing architects, and were subsequently approved by the National Commission of Fine Arts.

The drawings depict a colonial building with pillared front and square ground plan. The main feature is an auditorium to seat 6,000 people, which is arranged in the form of an ellipse, with the stage at one end and a deep balcony encircling the whole.

The work of construction must be begun before the 4th of March, 1915, or the authorization by Congress for the use of the above site

will lapse. It is further provided that the work of construction can not be commenced until the sum of \$1,000,000 is raised by the association; and although Mrs. Henry F. Dimock, president of the association and chairman of the building committee, has secured a part of this sum, much still remains to be raised.

The cost of the building must be not less than \$2,000,000, and there must be provided for its maintenance a permanent fund of not less than \$500,000. In the preamble of the original bill (S. 5494) passed by the Senate April 15, 1912, "to provide a site for the erection of a building to be known as the George Washington Memorial Building, to serve as the gathering place and headquarters of patriotic, scientific, medical, and other organizations interested in promoting the welfare of the American people," the purpose of the building is defined as follows:

Whereas George Washington, on July 9, 1799, said, "It has been my ardent wish to see a plan devised on a liberal scale which would spread systematic ideas through all parts of this rising empire," and it was Washington's wish to materially assist in the development of his beloved country through the promotion of science, literature, and art, and with the firm conviction that "knowledge is the surest basis of public happiness"; and

Whereas the changing conditions that time has brought require new methods of accomplishing the results desired by Washington and now a necessity of the American people; and

Whereas at the present time there is not any suitable building in the city of Washington where large conventions or in which large public functions can be held, or where the permanent headquarters and records of national organizations can be administered; and

Whereas a building should be provided in which there shall be a large auditorium, halls of different sizes where all societies pertaining to the growth of our best interests can meet, and such as it is deemed desirable may have permanent headquarters; and

Whereas the George Washington Memorial Association is now engaged in obtaining funds for the erection and endowment of a building suitable for the purposes above set forth, to be known as the George Washington Memorial Building: Therefore * * *

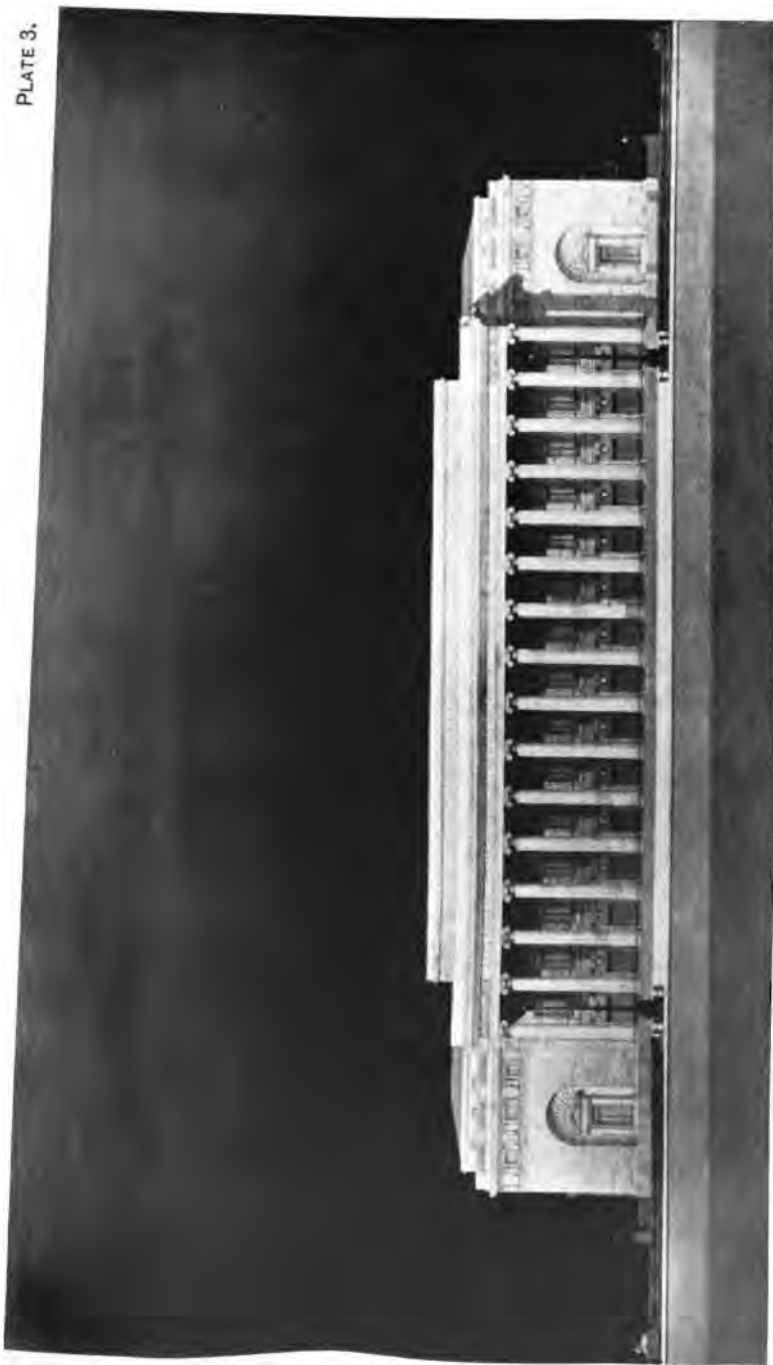
The law as passed by Congress and approved by the President March 4, 1913, was as follows:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled:

SEC. 10. That a building is hereby authorized to be erected in the District of Columbia, to be known as the George Washington Memorial Building.

The control and administration of said building, when erected, shall be in the Board of Regents of the Smithsonian Institution.

The George Washington Memorial Association is authorized to erect said building in accordance with plans to be procured by said association and to be approved by the Commission of Fine Arts, said building to be fireproof, faced with granite, and to cost not less than \$2,000,000; it shall have an auditorium that will seat not less than six thousand people, and such other smaller halls, reception rooms, office rooms, and so forth, as may be deemed necessary to



APPROVED DESIGN FOR GEORGE WASHINGTON MEMORIAL BUILDING.

carry out the purposes for which the building is erected. And the said George Washington Memorial Association shall in addition provide a permanent endowment fund of not less than \$500,000, to be administered by the Board of Regents of the Smithsonian Institution, the income from which shall, as far as necessary, be used for the maintenance of the said building.

Permission is granted the George Washington Memorial Association to erect said building in the north end of the reservation known as Armory Square, bounded by Sixth and Seventh Streets west and B Street north and B Street south. The south front of said building is to be on a line with the south front of the new National Museum Building, in the north end of the Smithsonian Park; and the said land is hereby set apart for that purpose: *Provided*, That the actual construction of said building shall not be undertaken until the sum of \$1,000,000 shall have been subscribed and paid into the treasury of the George Washington Memorial Association: *And provided further*, That the erection of said George Washington Memorial Building be begun within a period of two years from and after the passage of this act, and this section shall be null and void should the George Washington Memorial Association fail to comply with the provisions thereof, which are conditions precedent to the authorization herein granted.

Said building may, among other purposes, be used for inaugural receptions and special public meetings authorized by Congress.

Congress may alter, amend, add to, or repeal any of the provisions of this section.

NATIONAL MUSEUM.

Since the operations of the Museum are reviewed by Assistant Secretary Rathbun in the first appendix of this report and are discussed in detail in a separate volume, it seems unnecessary for me here to do more than to allude to some of the more important features of the year's work. The growth of the Museum during recent years has been greater than during any prior period of its history. Confined as it was for more than 30 years within restricted quarters poorly adapted for many classes of exhibits, its growth was greatly hindered and its value to the public hampered in many ways. With the completion of the new building, however, there has come an era of greater usefulness to the Nation in every direction. The natural history collections are now given adequate room in the spacious halls of the new building, while in the older structure opportunity is afforded for the proper display of objects relating to the arts and industries and to American history. Increase in every division of the three principal departments of the Museum—anthropology, biology, and geology—is now welcomed both for purposes of exhibition and in the study series.

During the last fiscal year there was added a total of 337,705 objects, 14,879 of which pertained to anthropology, 257,816 to zoology, 44,675 to botany, 3,648 to geology and mineralogy, 13,045 to paleontology, 2,930 to textiles and other animal and vegetable products, 505 to mineral technology, and 207 to the National Gallery of Art. The relative importance of many classes of objects thus acquired is

referred to in the assistant secretary's report. Among the most noteworthy accessions in ethnology were more than 500 objects from Dutch New Guinea, the Moluccas and Ambon of the Ceram group, collected and presented by Dr. W. L. Abbott, who has done so much for the Museum in past years toward increasing our knowledge of the zoology and ethnology of the Far East. Among the important acquisitions in biology were some 200,000 insects obtained by entomologists of the Department of Agriculture during economic investigations; a generous donation from Dr. E. A. Mearns, consisting of his large private collection of bird skins, eggs, and skeletons, containing many rarities; and over 10,000 specimens, mainly grasses, from the Department of Agriculture. Additions in geology and mineralogy included a 200-pound specimen of copper from Nevada; many specimens of minerals from various sources, including rare and excellent examples and some new forms; meteorites; Cambrian fossils; and three valuable type collections pertaining to the paleobotany of Alaska and other regions. Dr. E. O. Ulrich presented about 3,000 Paleozoic fossils of much value to the Museum. The division of textiles has been enriched by many important accessions and has been much extended in its scope during the year.

In the division of history there were large additions to memorials of eminent Americans and of historic events. An exhibit of period costumes installed in one of the history halls has attracted much attention. It includes a series of costumes worn by wives of many of the Presidents of the United States, and contains valuable examples of the styles of dress in America since the colonial period and a variety of articles of domestic and personal use. A unique photographic exhibit illustrates the apparatus and results of all stages of that art since the first attempts to obtain pictures through the agency of the sun.

The collection of fine arts has been enriched by further gifts from Mr. Charles L. Freer, of Detroit. His original gift, made in 1906, contained about 2,300 objects, and has since been increased to 4,701 most interesting and valuable examples of oriental and American art. The collection remains in the possession of the donor during his life. Mr. Freer has provided for the construction of a suitable building adjacent to the National Museum for the permanent preservation and display of the collection. Among permanent additions to the National Gallery were a number of paintings. The loans aggregated 109 paintings and 3 pieces of sculpture from various sources.

I have elsewhere mentioned the bequest to the Institution by Dr. Chamberlain of \$35,000, establishing a fund to promote the increase and scientific value of the Isaac Lea collections of precious stones and fresh-water mussels in the Museum.

In the interest of general education, particularly in natural history, it has been the custom for many years to distribute to schools and colleges throughout the country such duplicate material as can be spared from the Museum collections. During the past year 14,564 specimens were thus distributed, besides several hundred pounds of rocks, minerals, and ores.

The total attendance of visitors to the new or natural history building during the year was 267,728 for week days and 61,653 on Sundays, while the older building was visited by 146,533 persons.

The publications of the year numbered 14 volumes and 58 separate papers. The library has now increased to a total of 43,600 volumes and 73,765 pamphlets and other unbound papers.

The auditorium and other available rooms in the new building have proved of great convenience for meetings of scientific bodies and were largely utilized during the year. Accommodations were also afforded for several conventions of agriculturists, accompanied by exhibits of wool, fruits, and other products.

BUREAU OF AMERICAN ETHNOLOGY.

The work of the Bureau of American Ethnology during the year has brought together much new material relating to the habits and customs and the languages of the American Indians. The results of the studies of the several investigators are being published as promptly as practicable. The systematic researches by the ethnologists forming the scientific staff of the bureau are described in detail in the second appendix of this report. I may mention as of special interest a reconnoissance by Mr. F. W. Hodge, Ethnologist-in-charge, of a group of prehistoric ruins on a mesa in Cebollita Valley, N. Mex. These ruins consist of a number of house groups forming a compound built on an almost impregnable height, and designed for defense; not only the groups but the individual houses have the form of fortifications, while the vulnerable point of the mesa rim is protected by means of a rude breastwork of stones. The outer wall, which protects the whole mesa, is built of exceptionally fine masonry, probably the finest work to be found in ancient pueblo ruins of the Southwest. The building stones have been dressed to shape, matched for size, and their faces finished by pecking, with such labor as to confirm the belief that this ancient village was designed for permanent occupancy. Among the special features of interest which Mr. Hodge discovered were a burial cist in which skeletons, pottery, and the remains of a mat were found; three small cliff lodges situated in the sides of the cliffs; several ceremonial rooms or kivas associated with the ruined houses; and the remains of the early reservoirs of the inhabitants.

A study was made by Dr. Fewkes of prehistoric antiquities in the Lesser Antilles and material gathered for a proposed monograph on the aborigines of those islands. Examination was made of many village sites, prehistoric mounds, shell heaps, and boulders bearing incised pictographs. In a shell heap in Trinidad there was found a valuable collection of animal heads made of terra cotta and stone and other implements illustrating the early culture of the island. As a result of his researches thus far, Dr. Fewkes concludes that—

The New World, when discovered, had not advanced in autochthonous development beyond the neolithic age, whereas in Asia, Europe, and Africa a neolithic age was supplemented by one in which metals had replaced stone for implements. In the Old World this polished-stone epoch was preceded by a paleolithic stone age not represented, so far as is known, in America. The ethnology and archeology of our Indians is therefore only a chapter, and that a brief one, of a segment of a much more extended racial evolution, as illustrated in Asia, Europe, and Africa.

Further study was made by Mr. Mooney of the sacred formulas of the Cherokee Indians in North Carolina. In connection with this work a collection of medicinal plants was made, including some specimens of the native corn still cultivated as sacred and found to be a new and hitherto undescribed variety of special food importance under cultivation.

Investigations also progressed among the Fox Indians, the Creeks, Osage, Seneca, and other tribes, and in the study of various Indian languages and ceremonies much advancement was made. Toward a work on the habits and customs and ceremonies of the Tewa Indians of New Mexico there has been brought together much interesting information.

Several years ago there was begun a series of handbooks on the American Indians. The first of these was issued in two volumes, entitled "Handbook of American Indians North of Mexico," and contains a descriptive list of the stocks, confederacies, tribes, tribal divisions, and settlements north of Mexico, with sketches of their history, archeology, manners, arts, customs, and institutions. The work proved of so great value to the public that several reprintings became necessary, including a special reprint by the Canadian Government.

The Handbook of American Indian Languages forms the second of the series. Part I of this handbook has been published and portions of the second part have been printed in separate form. This work discusses the characteristics and classification of the languages of the American Indians and their relation to ethnology. In North America north of Mexico there are distinguished 55 linguistic families. The first volume of the handbook contains sketches of a number of the languages of the northern portion of the continent, in-

cluding the Athapascan, Tlingit, Haida, Chinook, Algonquian, Siouan, and Eskimo.

The third of the series of handbooks is in preparation. This will be a Handbook of American Antiquities. Work is also in progress on a Handbook of Aboriginal Remains East of the Mississippi, and it is proposed later to put in hand a series of handbooks of the Indians of the several States.

Publications issued during the year included a bulletin on Chipewewa Music and one on the Ethnozoology of the Tewa Indians; those in press at the close of the year were the Twenty-ninth, Thirtieth, and Thirty-first Annual Reports, besides four bulletins. There was distributed a total of 12,819 volumes or separate papers. The library of the bureau now numbers about 20,000 books, 13,000 pamphlets, and several thousand unbound periodicals. For the proper care of the library, steel bookstacks have been installed in the large hall on the first floor of the Smithsonian building.

INTERNATIONAL EXCHANGES.

Soon after the organization of the Institution there was created what is known as the International Exchange Service for the interchange of publications between the scientific and literary societies in the United States and other parts of the world. The mutual advantages of this system to all countries concerned has been reviewed from time to time, and I will not attempt to state them again here. During the past year there was handled by this service a total of 341,667 packages weighing 566,985 pounds. The weight of outgoing material was 424,481 pounds, and of incoming 142,504 pounds. Fifty-six sets of official publications of the United States Government are sent abroad in exchange with other Governments and form about half of the total weight of shipments, although the receipts from that source are comparatively small. In appendix 3 will be found details of the general operations of the Exchange Service including a list of foreign bureaus or agencies through which exchanges are transmitted.

NATIONAL ZOOLOGICAL PARK.

In establishing the National Zoological Park in 1890, "for the advancement of science and the instruction and recreation of the people," Congress placed its administration in the Board of Regents of the Smithsonian Institution. The collection in the park is the outgrowth of a small number of living animals which for several years had been assembled in very crowded quarters near the Smithsonian building mainly for the purposes of scientific study. Chiefly through gifts and exchanges the size of the park collection has grad-

ually increased, until it now numbers 340 species of mammals, birds, and reptiles represented by 1,362 individuals.

Among the 325 accessions during the year I may mention as of special interest a male hippopotamus, a pair of young Bengal tigers, a pair of young lions, a sable antelope, and an American white crane. Among some specimens received from the Zoological Garden at Giza, Egypt, was a pair of young African elephants. Thirty-eight individual donors contributed birds, reptiles, and other animals.

Popular interest in the park is shown by the fact that the number of visitors during the year was 733,277, or a daily average of 2,009, being an increase of 100,000 over the previous year. In the interest of education in nature study many schools, classes, etc., visit the park accompanied by their teachers; such groups during the year numbered 3,172 individuals.

The improvements in quarters for the animals and for the comfort of visitors are reviewed by the superintendent in Appendix 4. Ten breeding pens, in a yard 40 by 56 feet, were built to provide for the breeding and study of mink in cooperation with the Department of Agriculture.

The rough stone or bowlder bridge across Rock Creek, appropriation for which was made during the previous fiscal year, was opened to travel on November 1, 1913.

Perhaps the most important feature of the year in connection with the Zoological Park was an appropriation by Congress which became available for the purchase of about 10 acres to extend the western boundary of the park to Connecticut Avenue, between Cathedral Avenue and Klinge Road. Legal proceedings necessary to the transfer of this property had not been completed at the close of the year.

A new roadway to the park has been made to replace Quarry Road, which had a very steep and dangerous gradient.

Among the important needs, some of which have been urged in former reports, are (*a*) a suitable house for the care and preservation of the birds of the collection; (*b*) an adequate reptile house; (*c*) a pachyderm house; and (*d*) a hospital and laboratory. Attention is called to the statements of the superintendent urging these several needs, particularly with regard to the laboratory.

There is need, too, for extending the scope of classes of animals in the park, particularly those of common interest to the public, such as the gorilla, orang, and chimpanzee, giraffe, East African buffalo, and mountain goats and sheep.

ASTROPHYSICAL OBSERVATORY.

The work of the Astrophysical Observatory, described in detail in the report of its director, has comprised observations and computations at Washington and in the field relating to the quantity of

solar radiation, its variability from day to day, and the effect of the atmospheric water vapor in absorbing the radiations of great wave length such as are emitted toward space by the earth. Much attention has been given to the design, construction, and testing of new apparatus for these researches, including apparatus for measuring the sky radiation, special recording pyrheliometers to be attached to free balloons for the purpose of measuring solar radiation at great altitudes, and a tower telescope at the Mount Wilson Station.

The principal results of the year include: A new determination of the number of molecules per cubic centimeter of gas, depending on measurements at Mount Wilson of the transparency of the atmosphere; successful measurements by balloon pyrheliometers of the intensity of solar radiation up to nearly 45,000 feet elevation above sea level. The results tend to confirm the adopted value of the solar constant of radiation. Most important of all, the investigation by the tower telescope at Mount Wilson shows that the distribution of radiation along the diameter of the sun's disk varies from day to day and from year to year. These variations are closely correlated with the variations of the total amount of the sun's radiation. Thus the work of the year yields an independent proof of the variability of the sun and tends to elucidate its nature.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

The United States Bureau of the International Catalogue is administered by the Smithsonian Institution through a small annual appropriation by Congress. It is one of 33 regional bureaus in various countries engaged in the collecting, indexing, and classifying of scientific publications of the year, and the classified references are forwarded to the central bureau in London, where they are collated and published in a series of 17 annual volumes covering each branch of science and aggregating about 8,000 printed pages. These volumes are sold at an annual subscription price of \$85, chiefly to large reference libraries and important scientific institutions, the proceeds covering in part the cost of publication. During the past year there was forwarded to London from the United States bureau a total of 28,606 reference cards, making a total of 318,936 cards prepared in the United States since the system was organized in 1901.

NECROLOGY.

Augustus Octavius Bacon was born in Bryan County, Ga., October 20, 1839, and died in Washington City February 14, 1914. He became a member of the Board of Regents in 1905 and for three

years had served on the executive committee. Mr. Bacon was educated at the University of Georgia in 1859 and was honored with the degree of doctor of laws in 1909. He was for many years engaged in law practice at Macon, Ga. He became a United States Senator on March 4, 1895, and was thrice reelected, serving on many important committees of that body. As a Regent of the Smithsonian Institution he took deep interest in the development of plans for the advancement of science and the general welfare of mankind.

Irvin St. Clare Pepper, born in Davis County, Iowa, June 10, 1876, became a member of the Board of Regents of the Smithsonian Institution in December, 1911, and was reappointed December 10, 1913. He died on December 22, 1913. Mr. Pepper graduated from the Southern Iowa Normal School in 1897 and received the degree of bachelor of laws from the George Washington University in 1905, and in 1906 entered law practice at Muscatine, Iowa. He was county attorney from 1906 to 1910 and member of the Sixty-second and Sixty-third Congresses. Resolutions to the memory of Mr. Pepper were adopted by the Regents at the adjourned annual meeting January 15, 1914.

Frederick William True, born at Middletown, Conn., July 8, 1858, died in Washington City June 25, 1914. He was appointed an Assistant Secretary of the Smithsonian Institution June 11, 1911, his special duties being in connection with the library and international exchanges. Dr. True had held various positions of trust under the Institution since 1881. The following tribute to his memory was adopted by his associates at a meeting on June 26, 1914:

Frederick William True, master of science, doctor of laws, Assistant Secretary of the Smithsonian Institution, died at Washington, D. C., June 25, 1914, in the fifty-sixth year of his age.

His associates in the Smithsonian Institution and its several branches, assembled at a meeting in his memory at the United States National Museum on June 26, do here record their profound sorrow in the loss of an honored scholar, an executive officer of marked ability, a sincere friend, a patriotic citizen, and a modest man.

Graduated from the New York University at the early age of 20, he at once entered the service of the United States as the youngest member of the scientific corps brought together by Profs. G. Brown Goode and Spencer F. Baird during the formative stages of the National Museum. Through faithful performance of duty in positions of trust he leaves to his associates an example worthy of emulation, and through his unassuming and upright personality a cherished memory.

Respectfully submitted.

CHARLES D. WALCOTT, *Secretary.*

APPENDIX 1.

REPORT ON THE UNITED STATES NATIONAL MUSEUM.

SIR: I have the honor to submit the following report on the operations of the United States National Museum for the fiscal year ending June 30, 1914:

INTRODUCTORY.

The last report contains a brief review of the exhibits in the new building, which mainly relate to zoology, geology, and anthropology, though also including the paintings of the National Gallery of Art and certain special and temporary installations. The natural history collections, while presenting a generally finished appearance, are, however, as there explained, still incomplete and to a large extent provisional in their arrangement. Considerable progress toward their improvement was made during last year, and this work will be continued as rapidly as possible until, to the extent of the material available, some degree of perfection has been reached, but the purposes of the Museum would be poorly served if more or less, and even radical, changes were not made from time to time in those parts of the collections which belong especially to the public.

Because of extensive interior alterations going on in the Smithsonian building, it was necessary temporarily to withdraw the graphic arts collection from display, but upon the completion of this work the surroundings for this important division will be greatly improved. In the older Museum building, moreover, there was much activity in connection with the exhibits, though not as much was accomplished as was desirable or would have been possible with a slightly increased appropriation. This building has been entirely given over to the arts and industries and American history. Square in shape, its exhibition space, amounting to about 100,000 square feet, is divided into four naves or halls, radiating from a central pavilion, the naves in turn being connected by ranges, eight in number, which follow the outer walls of the building and inclose four square covered courts. Although consisting of only a single story, except in the towers and pavilions, which are used for offices, most of the halls are supplemented by galleries. The building faces north, and its different subdivisions are designated by their position with

reference to the rotunda. In planning for the distribution of the collections it has not been found possible to provide for all of the subjects which should be comprehended, and the fact that a few of the halls are still unarranged is due in part to the insufficient force and in part to the length of time required for the preparation of many of the exhibits. A brief summary of the conditions at the close of the year may, however, be of some interest.

The division of history, formerly limited to the north hall, has been extended into the west north range and the north west range, and also occupies the floor space in the northwest court. The hall and connecting range contain the general collection of history, consisting chiefly of memorials. The collection of musical instruments previously filling the large wall cases along the sides of this hall, though not belonging to this division, have been removed to a corresponding position in the northwest court, leaving these cases to be used for historical furniture, of which the Museum has many important pieces. In one of them, however, "The Star-Spangled Banner" still remains, pending arrangements for a better installation. In the north west range has been placed the period costume collection, which was first opened to the public in February last. This noteworthy feature, which centers upon a series of White House costumes draped on manikins, contains many and valuable examples of the styles of dress in America from the colonial period to the present time, besides a great variety of articles of domestic and personal use. In the adjoining or northwest court are the coins and medals and the postage stamps, also an installation of last year. The former are shown in table cases, but the stamps required a special arrangement which has been carried out in the form of two long upright cases, fitted with framed sliding screens to which the stamps are attached. The gallery of this court is devoted to the unique photographic exhibit, illustrating by apparatus and results all of the stages in the progress of this art from the first attempts at obtaining pictures through the agency of the sun. The opening of this display was likewise a feature of the year.

On the left-hand side of the building on entering is the art textile collection in the east north range, followed by the boat hall, or north east range, in both of which but few changes were made. The division of mechanical technology, to which the exhibit of boats belongs, also occupies the east hall, the northeast court, and about one-half of the south east range. The court is mainly given over to small arms, both military and other, of which the collection is the largest and most varied in this country. The remaining space is used for a considerable variety of subjects, such as land and air transportation, electricity in its several applications, measures of space and time, and many miscellaneous devices and inventions, which are well

displayed and labeled and to which numerous additions have recently been made. In the gallery of the court are the collections of ceramics, glass-ware, bronzes, etc., and in the north gallery of the hall is the exhibit of the division of medicine.

The southern part of the building has been allotted to two divisions, which, organized some 30 years ago but soon discontinued on account of lack of space, have recently been reestablished on a broader basis and have already attained considerable prominence. One of these is the division of textiles, including also such animal and vegetable products as do not specifically belong elsewhere. To this division have been assigned the south hall, the east south range, and the southeast court, together with a considerable amount of gallery space. While much of the original collection, when removed from storage, was found to be still serviceable, the greater part of the textile display, which is exceedingly rich and varied in its representation of this industry in the United States, is the accumulation of only two years. There is also a fair illustration of the work done in the Philippines and some examples from Porto Rico. The exhibition of animal and vegetable products is much less advanced, and there is still to be taken up the subjects of commercial woods and of foods.

The division of mechanical technology has been assigned the west hall, the south west and west south ranges, and the southwest court, the occupation of all of which has been planned, in part definitely, in part provisionally. The objects of this division are to illustrate the processes involved in extracting minerals from the earth, and in the utilization of the products so obtained, with the intention of covering all the important minerals, both metallic and nonmetallic. Progress with this exhibition will be slow, because of the time required to build models, in which the mining and manufacturing interests are giving hearty and generous support, even to the extent of furnishing expensive reproductions of their works and operations. The first of the exhibits, opened to the public last year, relate mainly to the subject of coal, and include several excellent models, the largest of which, representing a bituminous colliery, occupies fully half the floor space of the southwest court. A number of other models and exhibits were also completed and installed, and additional ones were in course of construction.

COLLECTIONS.

The additions to the collections aggregated approximately 337,705 specimens, apportioned among the several branches of the Museum as follows, namely: Anthropology, 14,879; zoology, 257,816, of which over 214,000 were insects; botany, 44,675; geology and mineralogy, 3,648; paleontology, 13,045; textiles and other animal and vegetable

products, 2,930; mineral technology, 505; and the National Gallery of Art, 207. There were also received as loans 2,280 objects, mainly for the exhibition series in ethnology, archeology, history, and the Gallery of Art.

The most noteworthy accessions in ethnology consisted of over 500 objects from northern Dutch New Guinea, the Moluccas and Ambon of the Ceram group, collected and presented by Dr. W. L. Abbott; an especially important lot of material obtained at St. Lawrence Island, Alaska, by Dr. Riley D. Moore, of the Museum staff; and a series of Siouan ethnologica of particular value, as the locality and tribal origin of the specimens are properly recorded. The principal additions in American archeology comprised material from old Indian camp sites and caves in Patagonia and from Guatemala, the results of explorations by Mr. Chester W. Washburne in the former region, and by Mr. Neil M. Judd in the latter; an interesting series of stone implements from Jackson County, Mo., presented by Mr. J. G. Braecklein; and a large number of exceptionally fine specimens of the same character from Missouri and Illinois, purchased from Mr. D. I. Bushnell, jr. The collection of Old World archeology was enriched by a drawing in color of an ancient mosaic map of Palestine and adjacent regions, the gift of Mr. S. W. Woodward; an important contribution from the Egypt Exploration Fund through Mr. Woodward; a large number of ancient coins and other objects from the Near East, lent by Mrs. John Paul Tyler; and several series of prehistoric material from Europe. The more notable accessions in physical anthropology consisted of human crania and skeletons, mainly of the Eskimo and Aleuts, the Buriats of central Siberia, the Mongolians, the natives of Mělnik, Bohemia, the Patagonians, and early man in Europe. The division of mechanical technology received a circular sundial adapted to the latitude of Peking and inscribed in Chinese characters from Mr. Claude L. Woolley; a set of ancient German coin scales made by Johann Daniel Ellinghaus, in Radevormwalde, Germany; important additions to the series of fire-arms, and many other objects. There were a number of interesting contributions in pottery and bronze, and also several desirable gifts to the collections of graphic arts and musical instruments.

The division of history was the recipient of many accessions, some of which were of much value, and an exceptionally large percentage were permanent acquisitions. There were additions to the Washington collection; pieces of furniture formerly belonging to Alexander Hamilton and Gen. Philip Schuyler; relics of Rear Admiral Charles Wilkes, United States Navy; of Aaron Burr, and of Prof. Spencer F. Baird; the sword carried by Brig. Gen. Strong Vincent, United States Volunteers, when mortally wounded at Little Round Top, Gettysburg; and a large collection of canes, interesting historically

as well as for their workmanship, some having been owned by persons of high distinction. The collection of postage stamps, postal cards, and stamped envelopes was increased to the extent of about 9,000 examples, and many additions were made to the series of coins and medals and of portrait photographs. So many contributions were received for the period costume collection as to permit of the installation and opening of the hall allotted to this subject.

Especially notable among the acquisitions in biology were some 200,000 insects obtained by entomologists of the Department of Agriculture during economic investigations in Texas and neighboring States. Mr. H. C. Raven, whose work has continued to be maintained by Dr. W. L. Abbott, sent over 1,500 mammals and birds from eastern Borneo, including numerous rare and probably some new forms. Besides extensive collections of fishes and marine invertebrates, the Bureau of Fisheries transferred a large number of reptiles and batrachians from various parts of North America, and the first series, with the types, of the mammals obtained in Lower California during the cruise of the steamer *Albatross* in 1911. The Biological Survey, in addition to its regular deposits of North American mammals and birds, turned over to the Museum many mammals from Patagonia and reptiles and batrachians from Panama, and Prof. A. M. Reese contributed a large quantity of specimens of several groups collected by him at the Philippine Islands. Additional mammals were received from China, Africa, the island of Sardinia, etc., and reptiles and batrachians from California, Mississippi, Alabama, and other southern States. A generous donation from Dr. E. A. Mearns, United States Army, retired, consisted of his large private collection of bird skins, eggs, and skeletons, containing many rarities. Other sources of fishes than those above referred to were Japan, Fanning Island, the Philippines, Panama, and California; and of insects, the Bahama Islands, Florida, the southwestern and western States, and Alaska, besides which important series in several groups of insects of economic importance were among the contributions. The division of mollusks received as gifts the important collection of the late Prof. F. W. Bryant, of Lakeside, Cal.; about 2,000 specimens obtained by Mr. John B. Henderson, jr., during a dredging expedition to the vicinity of Chincoteague, Va., and many other valuable donations. The marine invertebrates from the Bureau of Fisheries consisted chiefly of material in several groups which had been the subject of study and report. About 100 species of rotifers, mounted on slides, were presented by Mr. H. K. Harring, and numerous more or less important collections were received from various sources. The additions to the herbarium comprised over 10,000 specimens, mainly of grasses, from the Department of Agriculture, resulting from recent field work; about 3,500 West Indian and African plants from the New

York Botanical Garden; nearly 1,600 Chinese plants from the collection of Mr. E. H. Wilson; about 10,000 specimens of cryptogams collected by the late John B. Leiberger and presented by Mrs. Leiberger; and important contributions from Venezuela, Guam, the Philippines, and the southern and southwestern States.

Among the additions in geology and mineralogy were an important series of rocks and ores from the Sudbury nickel region and the Cobalt mining district of Canada; a suite of recently described minerals from Peru; a 200-pound specimen of copper from Nevada; an unusual deposit of carnotite in a fossil tree trunk; a large piece of quartz vein, containing an abundant development of blade-like crystals of tungsten ore; and many specimens of minerals from various sources, including rare and excellent examples and some new forms. The collections of meteorites and building stones received many desirable additions, and the Geological Survey deposited a number of series of rocks, of petrological value, from different parts of this country and from Hawaii. The accessions in invertebrate paleontology included about 150 types of Cambrian fossils collected and described by Secretary Walcott; some 5,000 specimens from the Middle Cambrian of British Columbia, also collected by him; and about 150 type specimens of Bryozoa and Ostracoda, representing work of the curator of the division on the Silurian collections from the island of Anticosti, preserved at Yale University. The Geological Survey transferred several collections, some of which had been described; Dr. E. O. Ulrich presented about 3,000 Paleozoic fossils, of much value to the Museum; and an important series of Tertiary mollusks and Ordovician graptolites was received in exchange from Australia. The most important acquisitions in vertebrate paleontology consisted of a large collection made by Mr. Charles W. Gilmore in the Blackfeet Indian Reservation; of the results of further explorations by Mr. James W. Gidley in the Pleistocene cave deposits near Cumberland, Md.; and of cetacean remains collected in the Miocene beds near Chesapeake Beach, Md., by Mr. William Palmer and Mr. Norman H. Boss. The section of paleobotany was enriched by three valuable type collections from the Geological Survey, representing the Jurassic formation at Cape Lisburne, Alaska; the Tuscaloosa formation of Alabama; and the Cretaceous and Tertiary in South Carolina and Georgia.

The number and value of the accessions in the division of textiles were greatly increased over those of the previous year, due to the appreciation shown by the producers in the important work which the Museum has undertaken. Only a brief summary can here be given of the many contributions which were almost wholly in the form of gifts. To the cotton collection were added fancy wash dress goods and shirtings, comprising pleasing and artistic combina-

tions of plain, ratine, and mercerized cotton yarns, with spun silk and viscose silk in plain and fancy weaves; plain, piece-dyed and yarn-dyed dress goods of all cotton and cotton and artificial silk; cotton fabrics finished to imitate those of silk and of wool and fancy printed cotton velvets in gold and silver effects for millinery purposes. The collection of wool and woollen products was enriched by a large assortment of new fleeces of the best American and foreign wools, all carefully graded and labeled to show the value in the grease and when scoured; specimens marking the steps in the manufacture of both woollen and worsted goods, and many pieces of finished fabrics of both classes. The already extensive silk collection was enlarged by the addition of a commercial package of skeins of the finest Japanese raw silk, many yards of printed broad silks representing the latest seasonable designs, brocaded novelty silks for dress trimmings, and samples of ties, scarfs, veilings, and ribbons of all kinds. Another important acquisition was the oldest model of the Grant silk reel, now in universal use for winding silk into standardized crossed skeins. The manufacture of fur felt hats from the finest grades of beaver, nutria, hare, and coney furs was illustrated by a comprehensive collection showing each step in the process from the fur pelt to the finished hat, and including the leather and silk trimmings for the principal types of hats. The development of an artist's plan for the decoration of a fabric by weaving or printing was represented by a series of preliminary sketches, weaver's drafts, and engraved plates for use on the pantograph machine, all bearing on the technology of design.

In the division of mineral technology, including a few of the exhibits presented at the St. Louis exposition of 1904, which had not previously been unpacked and recorded, the principal accessions of the year were as follows: A very full illustration of the processes of glass making; a complete working model of a bituminous colliery at Fairmont, W. Va., covering a space of 30 by 40 feet; a reproduction of a bituminous mine at Willock, Pa., 8 by 12 feet square, which excellently supplements the former; a relief panel illustrating processes involved in the manufacture of illuminating gas, tar, ammonia, and other coal products in what is known as the by-products coke industry; a number of photographic enlargements depicting typical underground operations incidental to coal mining; a series of native gypsum and gypsum products; and a collection illustrating crude mica and its industrial products.

NATIONAL GALLERY OF ART.

The most important acquisition consisted of the formal transfer to the Institution, by Mr. Charles L. Freer, of Detroit, Mich., of 198 objects as additions to his munificent gift to the Nation, comprising the

material which he had assembled since the last previous transfer in November, 1912. This collection, as will be recalled, relates wholly to American and oriental art, and is to remain in the possession of the donor during his life. The original gift, made in 1906, contained approximately 2,326 objects, but through subsequent contributions this number has been increased to 4,701, of which 983 are examples of American art and 3,718 are examples of oriental art. These may be summarized as follows:

In the American section James McNeill Whistler is represented by 62 oil paintings, 44 water colors, 32 pastels, and 798 drawings, etchings, lithographs, etc., besides 1 album of sketches, 38 original copper plates, and the entire decoration of the famous Peacock Room. The remainder of this section is composed of 75 oil paintings, 6 water colors, 25 pastels, and 1 silver point, illustrating the work of 9 other American painters, namely, Thomas Wilmer Dewing, Childe Hassam, Winslow Homer, J. Gari Melchers, John Singer Sargent, Joseph Lindon Smith, Abbott Handerson Thayer, Dwight William Tryon, and John Henry Twachtman. The oriental paintings comprise 826 screens, panels, kakemono, and makimono from Japan and China; 32 albums of paintings and sketches from the same countries; and 13 paintings from Tibet. Of oriental pottery there are 1,665 pieces, mainly from Japan, China, Corea, central and western Asia, and Egypt; of bronzes, 236 pieces, of which over 200 came from China; of stone objects, including sculptures, 234 pieces, mainly Chinese; of wood carvings, 17 pieces; and of lacquered objects, 31 pieces. The collection also contains over 600 pieces of ancient Egyptian glass in the form of bottles, vases, and various other shapes, besides a large number of miscellaneous objects from both the Far and Near East.

Other permanent additions to the Gallery consisted of 3 paintings by Miss Clara Taggart MacChesney, Guy C. Wiggins, and Addison T. Millar, respectively, contributed by Mr. William T. Evans, of New York; a painting by Du Bois Fenelon Hasbrouck, presented by Mr. Frederic Fairchild Sherman in memory of his wife; and 4 paintings by Walter Shirlaw and a portrait sketch of him by Frank Duveneck, received as a gift from Mrs. Shirlaw.

The loans to the Gallery aggregated 109 paintings and 3 pieces of sculpture from 12 sources. Eighty-one of the paintings were received for 2 special exhibitions, the first comprising 25 portraits in oil from the National Association of Portrait Painters, the other consisting of 56 marine paintings by Mr. William F. Halsall, of Boston.

MISCELLANEOUS.

It is gratifying to announce a bequest by the late Rev. Dr. Leander Trowbridge Chamberlain, an honorary associate of the Museum, of the sum of \$35,000, to be known as the Frances Lea Chamberlain

fund, the income of which is to be used for promoting the increase and the scientific value and usefulness of the two important Isaac Lea collections, \$25,000 being given on account of the gems and precious stones and \$10,000 on account of the fresh-water mussels or Unionidæ. Owing to delay in the settlement of the will, payment had not been made to the Institution at the close of the year.

By the will of Miss Lucy Hunter Baird, daughter of Prof. Spencer F. Baird, the second Secretary of the Smithsonian Institution, the Museum received during the year many interesting objects for its collections and several hundred important books for its library.

The distribution of duplicate material suitable for teaching purposes to schools and colleges in all parts of the country aggregated 14,564 specimens, besides several hundred pounds of rock and mineral fragments for blowpipe analysis. These were sent out in 148 separate sets, and consisted mainly of rocks, minerals, ores, fossils, and mollusks and other marine invertebrates. In exchange transactions with other establishments and with individuals over 15,000 duplicates were used, about 80 per cent of this number being plants. The loans to specialists for study comprised 10,256 specimens of animals and plants, and 5,425 specimens from the department of geology, besides 746 unassorted lots of marine invertebrates and 107 lots of fossils.

The total attendance of visitors at the new building aggregated 267,728 for week days and 61,653 for Sundays, making the daily average for the former 855 and for the latter 1,185. The number who visited the older Museum building was 146,533, a daily average of 486, and the Smithsonian building 102,645, a daily average of 328. The falling off in attendance at these two buildings may be ascribed to the fact that many of the halls in the former, emptied by the withdrawal of the natural history collections, have not yet received their new installations, and extensive rearrangements and repairs in the Smithsonian building practically caused the closing of its exhibition rooms for a considerable part of the year.

The publications of the year numbered 14 volumes and 58 separate papers, 49 of the latter belonging to the series of Proceedings and 9 to the Contributions from the National Herbarium. In addition, 31 short papers on materials in the collections of the Museum, relating mainly to new discoveries, were printed in the Smithsonian Miscellaneous Collections. The total distribution of Museum publications amounted to about 93,200 copies.

The library received 1,917 volumes, 1,723 pamphlets, and 132 parts of volumes, and its total contents were thereby increased to 43,609 volumes and 73,765 pamphlets and other unbound papers, the greater part of which have been obtained through exchange and as gifts. Good progress was made in the reorganization and arrangement of

the section of the library relating to the arts and industries, which occupies the former library quarters in the older Museum building.

The auditorium and other rooms in the new building were frequently used for meetings and public gatherings having objects akin to those of the Institution, and also by several bureaus of the Government for official purposes. The regular meetings of the Washington Society of the Fine Arts and the Anthropological Society of Washington were held here, as were the public sessions of the annual meeting of the National Academy of Sciences and the meetings of the Spanish-American Atheneum and the American Ornithologists' Union. Lectures were delivered under the auspices of the Washington Academy of Sciences, the Medical Society of the District of Columbia, the Washington Society of Engineers, the George Washington University, the Washington Society of the Archaeological Institute of America, the Germanistic Society of Washington, the Columbia Chapter of the Daughters of the American Revolution, the District of Columbia Chapter of the Guild of American Organists and other musical societies, and the Home Club of the Department of the Interior. A special program of American music was also rendered by the Friday Morning Music Club. Of three congresses, one held in Chicago, the others in Washington, each had a special meeting in the auditorium for addresses by distinguished persons. These were the Third International Congress of Refrigeration, the fourth annual meeting of the American Association for Study and Prevention of Infant Mortality, and the Third International Congress on the Welfare of the Child. On April 18, 1914, a reception to the Daughters of the American Revolution was given by the Secretary of the Institution.

The accommodations afforded by the new building were utilized on numerous occasions by bureaus of the Department of Agriculture for meetings, conferences, and hearings, including a series of lectures under the Bureau of Plant Industry and a conference with the wool-growers, accompanied by an excellent exhibition of wool specimens, which has been deposited in the Museum. A meeting of the American Pomological Society in conjunction with the Eastern Fruit Growers Association, the Northern Nut Growers Association, and the Society for Horticultural Science, held in November, 1913, brought together in the foyer of the building one of the finest exhibitions of fruit that has ever been displayed in this country.

Respectfully submitted.

RICHARD RATHBUN,

Assistant Secretary in Charge U. S. National Museum.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

OCTOBER 6, 1914.

APPENDIX 2.

REPORT ON THE BUREAU OF AMERICAN ETHNOLOGY.

SIR : In response to your communication dated July 1, I have the honor to present the following report on the operations of the Bureau of American Ethnology for the fiscal year ending June 30, 1914, conducted in accordance with authority granted by the act of Congress approved June 23, 1913, making appropriations for the sundry civil expenses of the Government, and with a plan of operations submitted by the ethnologist-in-charge and approved by the Secretary of the Smithsonian Institution. The provision of the act authorizing the researches of the Bureau of American Ethnology is as follows:

American ethnology : For continuing ethnological researches among the American Indians and the natives of Hawaii, including the excavation and preservation of archæologic remains, under the direction of the Smithsonian Institution, including salaries or compensation of all necessary employees and the purchase of necessary books and periodicals, including payment in advance for subscriptions, \$42,000.

SYSTEMATIC RESEARCHES.

The systematic researches were conducted by the regular staff of the bureau, consisting of nine ethnologists, including the ethnologist-in-charge and several special investigators. These operations may be summarized as follows:

Mr. F. W. Hodge, ethnologist-in-charge, was occupied during most of the year with the administrative affairs of the bureau. Considerable attention, however, was devoted to the preparation of the annotated bibliography of the Pueblo Indians, which is probably more extensive than that of any other group of tribes, as Pueblo written history commenced in the year 1539, and the writings pertaining thereto are exceedingly voluminous. The bibliography is recorded on cards, the number of which is now about 1,900. The cataloguing of the vast amount of manuscript material bearing on the subject has been somewhat simplified by the recent publication of Bolton's Guide to Materials for the History of the United States in the Principal Archives of Mexico, published by the Carnegie Institution of Washington, and Twitchell's Spanish Archives of New Mexico, although without consultation of the documents themselves it is not possible to give more than the title in most cases. In the

spring Mr. Hodge made a brief visit to the library of the Presbyterian Board of Home Missions in New York City, where he was enabled to record the titles of numerous published writings on missionary efforts among the Pueblo Indians of New Mexico, not accessible elsewhere. In this bibliographical work he has had the assistance of Mrs. Frances S. Nichols and Miss Florence M. Poast. Mr. Hodge continued to represent the bureau on the Smithsonian Advisory Committee on Printing and Publication, and the Smithsonian Institution on the United States Board on Geographic Names.

Early in the autumn of 1913 Mr. Hodge made a reconnoissance of a group of ruins, evidently prehistoric, on a mesa rising from the southwestern margin of the Cebollita Valley, about 20 miles south of Grant, Valencia County, N. Mex., and only a few yards from the great lava flow that has spread over the valley to the westward for many miles. While no very definite information regarding the origin of this ruined pueblo has yet been obtained, there is reason to suppose that it was occupied by ancestors of the Tanyi, or Calabash, clan of the Acoma tribe, and is possibly the one known to them at Kowina.

These ruins consist of a number of house groups forming a compound. That the structures were designed for defense is evident, for not only are they situated on an almost impregnable height rising about 200 feet above the valley, but the houses themselves partake of the form of fortifications, while the only vulnerable point of the mesa is protected at the rim by means of a rude breastwork of stones. Moreover, the outer walls of the buildings, some of which still stand to a height of several feet, are pierced only with loopholes, entrance to the structures doubtless having been gained by means of portable ladders, as in some of the pueblos of to-day. The houses of the great compound, consisting of four compact groups of buildings, were evidently "terraced" on the plaza side, the rooms facing this court perhaps having been only a single story in height. As a further protection to the pueblo, the eastern side was defended by a low wall, pierced by three gatewaylike openings, extending from the northeastern to the southeastern corner of the compound.

The rooms indicated in the ground plan of the four house groups number approximately 95 (for the northern group), 58 (eastern group), 32 (central group), and 102 (southeastern group), or an aggregate of 287 rooms. At the time of its occupancy the number of rooms in the compound probably approximated 550. In addition, there are traces of four or five single-story rooms abutting on the defensive wall bounding the northeastern part of the compound. A short distance from the southwestern angle of the southwestern house group are two smaller detached houses, the southernmost one consisting of 24 rooms in a long tier, 2 rooms deep, extending approximately NNW. and SSE. The other structure, about 55 feet north-

westward, is rectangular and contains 11 rooms in its ground plan. Four kivas are traceable among the rooms of the main compound—one in the northwestern, one in the central, and two in the southwestern group. In each case, so far as is determinable without excavation, the outer walls of the kivas are rectangular, while the inner walls are circular and slightly recessed a short distance above the floor.

About 500 feet southeastward from the main compound, at the edge of the mesa, stand the well-preserved walls of another structure, consisting of a double row of rooms, the outer wall, or that overlooking the mesa rim, extending 28 and 15 feet, respectively, beyond the northwestern and southwestern corners of the building proper, in order to give further protection. The length of this outer wall from angle to angle is about 132 feet. It exhibits one of the finest examples of masonry to be seen in the ancient pueblo ruins of the Southwest, for not only have the building stones been dressed to shape, but their faces have been finished by pecking, with such labor as to confirm the belief that the ancient village was designed for permanent occupancy. The southern corner of the outer defensive wall is not only curved, but the stones of which it is built are rounded by careful pecking, a most unusual feature in pueblo architecture. That this last structure was designed to protect the most vulnerable part of the mesa is evident from the fact that the outer wall is without openings of any kind and extends beyond the rooms of the structure, and because the adjacent mesa rim is protected by a rude low wall, especially at such points as required ready defense against attack from below. As already noted, the walls of these ruins are noteworthy by reason of the excellence of their masonry, special effort having been made to produce a pleasing effect in the exterior faces. Of the inner walls so much can not be said; but as there is no question that when the houses were occupied the rooms were smoothly plastered, there was little need of the elaborate finish accorded the exposed masonry. Slight attention was paid either to regularity in the shape of the stones or to smoothness of surface in building the inner walls, nor was the aboriginal mason more particular in bonding the inner and outer courses than in "breaking" the joints of the outer face. It seems remarkable that, possessed of such patience and expertness as the builders here display in other ways, they seem to have been unaware of the necessity of avoiding the construction of their walls in such manner that in places as many as six or seven vertical joints occur practically in line. In this brief report only mere mention can be made of many other interesting architectural features of these ruins, as well as of another pueblo ruin, more or less circular in shape, situated a few miles northeastward on a low mesa at the extreme head of Cebollita Valley, which here forms a small but beautiful canyon.

The inhabitants of the great compound first described obtained their water supply by means of two principal reservoirs fed by the drainage from the great sandstone shelf on the southern slope of the mesa summit. These reservoirs are natural depressions in the rock, but the capacity of the larger one, which measures 35 by 90 feet and is about 5 feet in maximum depth, has been greatly augmented on the western side by an artificial retaining wall 14 feet long and 10 feet in thickness, with an exposed face of $2\frac{1}{2}$ feet on the reservoir side. So well did this reservoir evidently serve the ancient mesa-dwellers, that, during seasons of unusual rain, water still stands to a considerable depth within the depression. The smaller reservoir is triangular in outline and measures about 15 by 19 feet. An interesting feature in connection with the larger reservoir is the remains of a rude dike extending 60 feet along the rocky shelf above referred to, built for the purpose of diverting the flow of rain water from its natural course into the reservoir.

It is not yet known where the ancients of this pueblo customarily buried their dead, but probably the interments were made in the talus of the mesa, as is the case with the Hopi, of Arizona, to-day. There was found, however, in the corner of a shallow cavern in the northern face of the mesa, above the talus, a small cist, formed by a low and broken wall of masonry, which contained the somewhat incomplete skeletons of two adult females, one incomplete skeleton of a boy, and the incomplete and defective skeletons of two infants. With one exception these remains had been greatly disturbed by rats, which had burrowed their way through the bones and their accompaniments to the bottom of the cist and fairly filled the repository with cactus spines, excreta, and other débris of nest building. The remains were accompanied with several pottery vessels, chiefly bowls, one of which was covered with a well-preserved mat, plaited of a fibrous plant which Mr. Lyster H. Dewey, of the Department of Agriculture, identifies as a scirpus, and almost certainly *Scirpus validus*. The ornamentation of this pottery, as well as of the numerous sherds scattered about the ruins, consists of plain red, black on red, white on red, plain black, black on white, brown on white, brown on red, and many other combinations of color. All the decorations noted were in geometrical designs.

On the northern face of the mesa, but practically hidden from view except from one point in the valley below, is a small house shelter of excellent masonry, built beneath an overhanging ledge of the cliff which forms the roof. This shelter, which is provided with a single small opening overlooking the valley to the northward, was seemingly designed as a lookout station either for watching the crops or an approaching foe. Across the valley, on the eastern side of the first great mesa directly opposite that on which the ruins are

situated, is another small cliff lodge, now accessible only by artificial means. Examination of the interior, as in the case of the cliff lodge above described, yielded nothing of interest. Farther up the valley, on the northern side, in plain view near the base of a mesa, is a larger cliff lodge, filled to a considerable depth with detritus from the soft stone forming the roof and side walls. Examination of the floor of this lodge a few years ago by Mr. Hodge yielded a few corncobs, one or two small objects made of yucca leaves, and a wooden drumstick of a form such as the Zuñi now employ.

Dr. J. Walter Fewkes, ethnologist, spent the month of July, 1913, in the office continuing the preparation of his monographic report on the aborigines of the West Indies, especially describing the many objects from these islands in the noteworthy collection of George G. Heye, esq., of New York. He made a visit to New York toward the close of the month to study recent additions to this collection and to supervise the preparation of the illustrations for his report. It became necessary, in order to make this memoir as comprehensive as possible, to investigate types of the Guesde collection, now owned by the Museum für Völkerkunde in Berlin. Accordingly Dr. Fewkes went to Europe at his personal expense and spent August, September, and October studying these types and also many undescribed Porto Rican and other West Indian objects in various museums. Drawings of about 140 specimens, many of which have not been described, were made during the course of these studies in Berlin. He also visited the museum at Copenhagen, Denmark, which contains many old specimens from the Danish West Indies and some rare types of prehistoric objects from Porto Rico, all of which were either drawn or photographed. West Indian objects were found also in the museum collections of Leipzig, Dresden, and Vienna. Some time was given to an examination of the dolmens and megaliths in the neighborhood of Berlin and elsewhere in northern Germany, and of the numerous mounds and prehistoric workshops on the island of Rügen in the Baltic Sea.

Dr. Fewkes spent his vacation on the shore of the Mediterranean, which he crossed, visiting the most striking ruins in Egypt, penetrating as far south as Assouan, and making special studies of the remaining evidences of neolithic man at Abydos and El Kab on the banks of the Nile. He had always in mind a study of prehistoric irrigation in this region, with a view to comparing the works with similar remains in Arizona. In the museums at Cairo and Assouan Dr. Fewkes examined considerable material dating back to late neolithic times and found a remarkable similarity not only in architectural features but also in stone implements, basketry, bone implements, and other artifacts from the valley of the Nile and those from our Southwest. One of the important features of the visit to Egypt

was a study of methods of excavation and repair of ruins adopted by Egyptologists. On his return from Egypt Dr. Fewkes passed through Greece and southern Italy and was able to acquaint himself with the method of excavation and repair of ancient ruins in these countries, especially those on the Acropolis and at Pompeii.

Dr. Fewkes arrived in Washington in April and immediately resumed work on his report on the Aborigines of the West Indies, which was continued during April and the greater part of May. In the latter month he again took the field and spent the whole of June in archeological research in the Mimbres Valley, N. Mex. In this work he was able to enlarge our knowledge of the distribution of pottery symbols and to add important collections to the National Museum. The Mimbres Valley is practically the northern extension into the United States of an inland basin known in Chihuahua as the Sierra Madre Plateau. The fact that its drainage does not connect with any stream that flows into the Atlantic or the Pacific Ocean imparts a peculiar character to its geographical environment. On the southern part of this plateau, as along the Casas Grandes River, mounds and ruins of large size are well known, from which have been taken some of the finest pottery in the Southwest; but the archeology of the extension of this plateau into New Mexico has never been adequately examined. In his brief reconnoissance Dr. Fewkes collected evidence that the prehistoric culture of the Mimbres Valley was strikingly characteristic. The decorated pottery from the ruins in this valley is unlike that of any other region. It consists mainly of mortuary food bowls, which the prehistoric inhabitants were accustomed to break or "kill" and place over the heads of the deceased, who were buried beneath the floors of the houses. About 60 specimens of beautiful pottery, more than half of which are ornamented with painted figures of human beings and animals, were found or purchased. As these are the first examples ever brought to the National Museum from this region, the results are gratifying. They afford through their geometrical ornamentation, and especially because of the life forms which predominate, an interesting insight into the ancient culture of the Pueblo region to the north and in the Gila Valley to the west. It is Mexican in type, and some of the fragments are practically identical in form and ornamentation with the beautiful pottery from Casas Grandes, Chihuahua.

During the year Dr. Fewkes added about 350 pages of manuscript to his report on the Aborigines of the West Indies, which was approaching completion at the close of the year.

Shortly before the close of the preceding fiscal year Mr. James Mooney, ethnologist, proceeded to the reservation of the East Cherokee Indians in western North Carolina for the purpose of continuing the translation and elucidation of the large body of sacred formulas,

written in the Cherokee language and alphabet, which he had obtained from the native priests and their surviving relatives some years ago, and about one-third of which he had already translated, with explanatory notes. In connection with this work a large number of plants noted in the formulas as of medicinal or other value were collected and transferred to the division of botany of the National Museum for scientific identification. In this collection were several specimens of the native corn of the Cherokee, still cultivated as sacred by a few of the old conservatives. On examination by the experts of the Department of Agriculture this corn was found to be a new and hitherto undescribed variety of special food importance under cultivation. Return was made from the field early in October, 1913.

In June, 1914, a brief trip was made into Prince Georges and Charles Counties, Md., for the purpose of investigating the status and origin of some persons of supposedly Indian descent, concerning whom several inquiries had come to the bureau. Mr. Mooney found, as he had supposed, that these people, numbering in all several hundred, were, like the Pamunkey of Virginia and the so-called Croatan of North Carolina, a blend of the three races, Indian, Negro, and White, with the Indian blood probably predominating. They constitute and hold themselves a separate caste, distinct from both white and negro. They probably represent the mongrelized descendants of the Piscataway tribe, and are sometimes locally distinguished among themselves as "We-Sort," that is, "Our Sort."

On June 22, 1914, Mr. Mooney again started for the East Cherokee to continue work on the sacred formulas, with a view to speedy publication.

His time in the office during the winter and spring was occupied chiefly with the extended investigation of former Indian population, together with routine correspondence and replies to letters of inquiry. On request of the Department of Justice he prepared an extended deposition on tribal ranges and Indian depredations in northern Mexico and along the Rio Grande, which was officially characterized as one of the most important and interesting that had ever come before the department.

In pursuance of his investigations of the Creek Indians and allied tribes, Dr. John R. Swanton, ethnologist, proceeded to Oklahoma early in July to attend the busk ceremonies, and was present at those of the Eufaula, Hilibi, Fish Pond, and Tukabachi Creeks. Notes were taken on all of these and photographs obtained of various features of all but the last. At the same time, with the valued assistance of Mr. G. W. Grayson, of Eufaula, Dr. Swanton gathered further ethnological information from some of the old people, and continued this work after the ceremonies ceased. Somewhat later

he visited the small body of Indians in Seminole County who still retain a speaking knowledge of Hitchiti, and added about 40 pages of text to that previously obtained, besides correcting a portion of Gatschet's Hitchiti vocabulary. He made an arrangement with an interpreter by which 100 pages of additional text were received after his return to Washington.

While some time was devoted to studies of the Alabama, Hitchiti, and Choctaw languages, most of Dr. Swanton's attention while in the office during the year was centered on two particular undertakings. One of these was the proof reading of the Choctaw-English section of Byington's Choctaw Dictionary, and the compilation, with the efficient help of Miss M. C. Rollins, of an English-Choctaw index, which will comprise about 350 printed pages, to accompany it. The other was work on the first draft of an extended report on the Creek confederacy, of which the historical part, consisting of 300 typewritten pages, is practically completed.

At the beginning of the year Mr. J. N. B. Hewitt, ethnologist, undertook the work of editing and copying the Seneca text "Shagowenotha, or The Spirit of the Tides," which was recorded by him in the form of field notes in 1896 on the Cattaraugus Reservation, New York. This particular piece of work, forming a text of 3,692 native words, was completed in August, 1913. The task of making a literal, almost an etymological, interlinear translation of this text was next undertaken and was completed in November, yielding an aggregate of 11,411 English words in the rendering. The other of the two native texts in Seneca, "Doodanegen and Hotkwisdadegena," which was recorded in the form of field notes by Mr. Hewitt in 1896, was next edited and copied; this work was completed by the close of December and consists of 4,888 native Seneca words. The literal interlinear translation of this text then taken up was completed in February, 1914, making 14,664 English words in the rendering.

On finishing these translations Mr. Hewitt commenced the reading and digesting of the Seneca material of the late Jeremiah Curtin for the purpose of providing notes and explanations to the stories, a task that was made the more difficult by the fact that Mr. Curtin's field notes of explanation and identification are not available. One of the longest of the stories collected by Mr. Curtin, "Doonogaes and Tsodiqgwadon," comprising 149 typewritten pages, required 144 notes varying in length from three or four lines to several pages; but this story is of exceptional length. The entire Curtin material has now been reread and annotated. Mr. Hewitt also completed the notes for his introduction to the "Seneca Myths and Fiction," and the final writing was almost finished by the close of the year.

As opportunity offered, Mr. Hewitt continued to work on a sketch of the Iroquois language, and he has now in hand about 75 pages of manuscript, in addition to a considerable body of notes and diagrams for incorporation into final form.

Mr. Hewitt also made a week's study of the voluminous manuscript "Dictionary of Words that have been Made Known in or Introduced into English from the Indians of North, Central, and South America," compiled by the late William R. Gerard, with a view of ascertaining its value for publication by the bureau. This examination was made difficult by the fact that the compiler of the dictionary had access to many works which were not available for Mr. Hewitt.

Unfortunately the work summarized above was often interrupted, owing to the need of frequently calling on Mr. Hewitt for the preparation of data for replies to correspondents, whose inquiries pertained to linguistic, historical, sociological, and technical matters. In connection with this work there were prepared 110 letters, rarely exceeding a page in length, although some occupied several pages and required considerable study and research in gathering the needed data for reply.

During the year Mr. Francis La Flesche, ethnologist, recorded the rituals and accompanying songs of five additional Osage ceremonies, known as Wáwatho^a, Wadóka Weko, Wazhi'gao, Zhi'gázhiga Zhazhe Thadse, and Wéxthexthe. Of these the Wáwatho^a is complete; the record fills about 150 pages, including songs, diagrams, and illustrations. This ceremony, which is of religious significance and is revered by all the people, has been obsolete for about 20 years, and there now remain only two men in the tribe who remember it in most of its details. It was a peace ceremony that held an important place in the great tribal rites of the Osage, for through its influence friendly relations were maintained among the various gentes composing the tribe, and it was also the means by which friendship with interrelated tribes was established and preserved. Early French travelers mention this ceremony as being performed by the Osage in one of the tribes of the Illinois confederacy during the second decade of the eighteenth century. Unlike the Osage war ceremonies, which are complex and composed of several steps or degrees, the Wáwatho^a is simple and complete in itself. The "pipes," sometimes called calumets, which are employed in its performance, consist of a number of sacred symbolic articles, each of which, with its attendant ritual, was in the keeping of a certain gens of the tribe. The assembling of these articles formed an essential part of the ceremony, for it was on this occasion that the ritual, which explained both the significance of and the precepts conveyed by the sacred articles, had to be recited. This Wáwatho^a ceremony resembled that

of the Omaha, Ponca, Oto, and Pawnee tribes, differing only in minor details. To the intelligent thinking class the aims and purposes of the ceremony are clear, but there are among the Osage, as among other tribes, those who can not comprehend fully the deeper, broader teachings of such a rite, and because of this restricted view superstitious beliefs regarding it now prevail among the lower classes.

The record of the Wadóka Weko, one of the seven war ceremonies, consists of 89 pages of manuscript, with 32 songs. This rite, which is the sixth degree of the war ceremony, is divided into eight parts, exclusive of the introductory rites, and consists of rituals and songs pertaining to the ceremonial cutting of the scalps for distribution among the various gentes for their sacred packs. One of these parts has to do with the *odó*, or "honors," won by the warriors in battle. While this ceremony is recorded completely, it is not yet ready for publication, since it is one of seven interdependent degrees the study of which is not yet finished.

Wazhi²gao, the bird ceremony for boys, is another of the seven degrees, and is regarded as important. It has been transcribed in full, but the notes thereon have not yet been elaborated for publication.

Zhi²gázhigá Zhazhe Thadse (naming of a child), a ceremony that bears no direct relation to any other, is regarded as essential to the proper rearing of a child, and is still practiced. This ceremony has been recorded in its entirety, but still lacks the descriptive annotation necessary before publication.

The Wéxthexthe, or tattooing ceremony, the last of the five recorded by Mr. La Flesche, was taken down from its recitation by one of the men who had participated therein. This transcription is still, in a measure, fragmentary, but enough has been obtained to render a fair idea of the significance of the tattoo designs employed. The notes on the Wéxthexthe are not yet prepared for publication, as there is still a possibility of recording the ceremony in its entirety. A set of the implements used by the Osage in tattooing have been obtained for illustration and have been deposited in the National Museum. There has also been placed in the museum a waxóbetó²ga, or great sacred pack, which once belonged to Waçéto²zhi²ga, a prominent man of the tribe, who died in 1910. After much persuasion his widow reluctantly consented to part with this sacred article, together with its buffalo-hair and rush-mat cases. This pack consists of the skin and plumage of a white pelican, the bird which in Osage mythology revealed through a dream the mysteries of tattooing and provided the implements therefor.

All the above-described ceremonies studied by Mr. La Flesche have still a strong hold on the Osage people; this, together with the fact

that every initiated person acquired his knowledge at great expense, has made it almost impossible to record the ceremonies in full from those who have been induced to speak about them.

Mrs. M. C. Stevenson, ethnologist, continued her studies of the ethnology of the Tewa Indians of New Mexico, devoting special attention to the pueblo of San Ildefonso, with a view of elaborating her memoir on this group of tribes, which consists of about 400 pages of manuscript, material relating to almost every phase of Tewa customs and beliefs having been added in whole or in part during the course of the year. Perhaps the most important of the new data gathered by Mrs. Stevenson on these interesting sedentary people relate to their ceremonies with respect to human sacrifice. The conservatism of the Tewa and the secrecy with which most of their numerous rites are conducted make them a difficult subject of study and one requiring considerable time. Mrs. Stevenson's memoir had reached such a stage of completion that at the close of the year she was making final arrangements for acquiring the materials still needed for illustrations.

Shortly after the beginning of the fiscal year Dr. Truman Michelson, ethnologist, proceeded to Tama, Iowa, to renew his researches among the Fox Indians. After successfully commencing these studies he proceeded to Tongue River Reservation in Montana for the purpose of studying the remnant of the Sutaio tribe incorporated with the Cheyenne. It seems that some ethnological information can still be obtained in regard to specific Sutaio matters, but little of the language remains. Dr. Michelson compiled a fairly large Sutaio vocabulary, but fewer than a dozen words are fundamentally different from the corresponding Cheyenne terms. Such grammatical forms as could be obtained indicate that Sutaio sheds little or no light on the divergent Algonquian type of the Cheyenne language.

Returning to Tama to renew his Fox studies, Dr. Michelson succeeded in elucidating the social organization almost to completeness. It appears that the two major divisions of the tribe are not purely for rivalry in athletics, but rather are ceremonial. Dr. Michelson was successful also in obtaining the very long myths of the culture hero and the Mother of all the Earth. It is evident that the actual Fox society still corresponds in a measure to that given in the myths.

In October Dr. Michelson proceeded to Kansas to investigate the Sauk and Fox of the Missouri. A reconnoissance only was made here, and some of the Fox material obtained at Tama was translated. In November he returned to Washington, and in January, 1914, visited the Carlisle Indian School for the purpose of studying special points of grammar and phonetics with some of the Sauk and Fox pupils. Thence he made a trip to New York City, taking with him one of the pupils for the purpose of consulting Dr. Franz Boas, hon-

orary philologist of the bureau, on certain mooted points pertaining to the Fox language. While in New York a few tracings were made with the Rousselot apparatus.

In May Dr. Michelson again visited Carlisle for the purpose of making a translation of the story of a sacred bundle of the Fox Indians, which he has recently procured.

Toward the end of the fiscal year Dr. Michelson devoted some time to the problem whether the Yurok and Wiyot languages of California were Algonquian, as had been recently claimed, and reached the conclusion that the existing evidence does not justify such a classification.

Work on the Handbook of American Indian Languages was continued under the personal direction and editorship of Dr. Franz Boas, honorary philologist. Part 2, which is in preparation, is to contain grammatical sketches of the Takelma, Coos, Siuslaw, and Alsea languages of Oregon; the Kutenai, of Montana; and the Chukchee. The Takelma sketch was published in advance in separate form in 1912. During the present year the printing of the sketch of the Coos, by Leo J. Frachtenberg, which forms pages 297-429 of part 2, was finished. The manuscript of the Siuslaw, also by Dr. Frachtenberg, was completed and revised, and, except for a small part, is in galley form. The Chukchee sketch likewise has been set up in galleys and revised, and new material on the dialects of the language, having become available, has been added. The printing of the sketch proceeded necessarily slowly, since the notes had to be read by the author, Mr. Waldemar Bogoras, who lives in Russia. A full treatment of this grammar is particularly desirable, since it serves to define the relationships of the American languages toward the west. Dr. Frachtenberg, a fuller report of whose work will follow, has made progress with his studies of the Alsea. The grammatical material and the texts have been extracted and studied, and the latter, which are to form the basis of the sketch, have been copied for the printer. Dr. A. F. Chamberlain, a valued collaborator, whose untimely death we lament, furnished a sketch of the Kutenai language. It was necessary to make a detailed study of this sketch. This was done by Dr. Boas partly during the winter in New York with the help of a Kutenai boy and partly during the month of June among the Indians of Montana and British Columbia. The report on this sketch was completed. A certain amount of preparatory work for the sketch of the Salish language was also done, more particularly a map showing the distribution of the Salish dialect, based on researches by James Teit, was completed. The expense of the field work for this map, which has occupied four years, was met by Mr. Homer E. Sargent, of Chicago, to whose lively interest in the Handbook and related subjects we are deeply indebted. The vocabularies on which the map is based are in an advanced stage of preparation.

Much time was devoted by Dr. Boas during the year to the preparation of a report on the mythology of the Tsimshian Indians, based on material written during a period of 10 years by Henry W. Tate, himself a Tsimshian. Owing to his recent death it was necessary to close the collection, the expenses of which have been defrayed from private sources. The monograph was completed and is in type for publication in the thirty-first annual report.

Brief reference to the researches of Dr. Leo J. Frachtenberg, ethnologist, has been made in connection with the preparation of part 2 of the Handbook of American Indian Languages. The beginning of the fiscal year found Dr. Frachtenberg in the field in Oregon, where, from June to September he was engaged in linguistic and ethnologic work on the Kalapooian family. During these months he collected a number of grammatical notes and nine texts in the dialect of the so-called Calapooia Proper, but owing to lack of sufficient means for continuing this field work he was compelled to discontinue it in October. The linguistic researches into the Kalapooian family brought out a number of interesting points, of which the most salient are as follows: Phonetically the family is related closely to the Lutamian (Klamath) and Sahaptin groups. Certain pronominal forms and a few numerical terms are identical with the Klamath and Sahaptin forms. In all other respects, chiefly morphological, Kalapooian bears close resemblance to the Coos, Siuslaw, and Yakonan stocks. A particularly close affiliation exists between this and the Coos family in the phonetic structure of words. While the phonetics of both languages are divergent, both are what may be termed vocalic languages and are practically free from any difficult consonantic clusters. The Calapooia texts thus far obtained deal chiefly with the Coyote cycle and are identical with myths found among the Coos, Molala, Klamath, Maidu, Chinook, Alsea, Takelma, Salish, and other tribes of the Pacific area. The mythology as a whole is typical of that region in the absence of true creation myths and in the multitude of transformation stories.

A survey of the linguistic phase of the Kalapooian stock shows it to embrace the following dialects: Calapooia Proper (also called Marysville), Chelamela, Yamhill, Atfalati, Wapato Lake, Ahantsayuk, Santiam, Lakmayut, and Yonkallat. These dialects show certain degrees of interrelationship, which may be formulated as follows: Calapooia, Santiam, Lakmayut, and Ahantsayuk form one closely related group; another group embraces the Yamhill and Atfalati dialects, while Yonkallat seems to constitute a group of its own. No information as to the Chelamela dialect could be obtained.

In July Dr. Frachtenberg received what seemed to be trustworthy information that some Willapa Indians were still living at Bay Center, Wash., but on visiting that point he found the reputed Willapa

to be in fact members of the Chehalis tribe, thus proving conclusively that the Willapa are entirely extinct.

Dr. Frachtenberg returned to New York late in October and was engaged until the beginning of December in the preparation of the Siuslaw grammatical sketch for the Handbook of American Indian Languages, additional work on which became necessary because of the fact that during his stay in the field he had received further information concerning this extinct stock. In December Dr. Frachtenberg took up his duties in Washington, becoming first engaged in supplying references from the Siuslaw texts in the grammatical sketch of that language. At the close of the year this sketch was in type. Dr. Frachtenberg also prepared for publication a Siuslaw-English and English-Siuslaw vocabulary, containing 90 typewritten pages. He furthermore prepared an English-Coos glossary, which may be utilized in the near future, as it has been found desirable to add such a glossary to each volume of native texts.

On completion of this work Dr. Frachtenberg commenced the preparation of the Alsea texts collected by Dr. Livingston Farrand in 1900 and by himself in 1910. These texts, consisting of 31 myths, tales, and narratives, and comprising 195 typewritten pages, will be submitted in the near future with a view to publication as a bulletin of the bureau.

At the close of the fiscal year Dr. Frachtenberg was preparing for another field season in Oregon, with the view of finishing his studies of the Kalapooian stock and of conducting similar researches among the Quileute.

Mr. W. H. Holmes, of the National Museum, continued his work on the preparation of the Handbook of American Antiquities for the bureau, reaching the practical completion of part 1 and making much headway in the preparation of part 2; progress in this work, however, was necessarily delayed owing to the pressure of many duties connected with a head curatorship in the National Museum.

During August, 1913, Mr. Holmes made a visit to Luray, Va., for the further study of an ancient village site near that place and the examination of certain implement-making sites in the vicinity. In June he visited Missouri for the purpose of studying certain collections owned in St. Louis and for the reexamination of an ancient iron and paint mine at Leslie. It was found, however, that recent mining operations had been carried so far that traces of the aboriginal work at the mine were practically obliterated, and besides the mine was found to be filled with water, making effective examination impossible. From St. Louis he proceeded to Chicago, where studies were made of certain collections with a view of obtaining data necessary to the completeness of the Handbook of American Antiquities.

In her studies of Indian music Miss Frances Densmore made two trips to the Standing Rock Reservation, S. Dak. (one in July and August, 1913, and one in June, 1914), where she engaged in investigations at Bullhead, McLaughlin, and the vicinity of the Martin Kenel School. This research completed the field work for the proposed volume of Sioux music, the material for which, subsequently prepared for publication, consists of 323 pages of manuscript, 98 musical transcriptions of songs, 20 technical analyses of songs, and 33 original illustrations.

The practical use which musical composers are making of the results of Miss Densmore's studies is very gratifying. Mr. Carl Busch has adapted for orchestral purposes four of the songs rendered by Miss Densmore and published by the bureau, as follows: (1) Chippewa Vision, (2) Farewell to the Warriors, (3) Love Song, (4) Lullaby. Mr. Heinrich Hammer, of Washington, has composed a Sun Dance Rhapsody and a Chippewa Rhapsody. Mr. Charles Wakefield Cadman has composed, for the voice, two of the Chippewa songs, "From the Long Room of the Sea" and "Ho, Ye Warriors on the Warpath." Mr. S. N. Penfield has harmonized two vocal quartets, "Manitou Listens to Me" and "Why Should I be Jealous?" For the violin Mr. Alfred Manger has prepared a "Fantasie on Sioux Themes," and Mr. Alberto Bimboni has well advanced toward completion an opera bearing the title "The Maiden's Leap." Certain of the orchestral arrangements have been played by the Chicago Symphony Orchestra (formerly known as the Thomas Orchestra), as well as by the symphony orchestras of Washington, Minneapolis, and Kansas City. It is interesting to note the demand for Sioux themes in advance of their publication. These have been furnished in manuscript as far as possible to those desiring them for specific and legitimate use. Two of the compositions in the foregoing list are based on such themes.

Work on the volume of Sioux music is approaching completion. This will be larger than either of the bulletins on Chippewa music, and, while the same general plan has been followed, there will be much that is new, both in subject matter and in style of illustration.

During the year work on the Handbook of Aboriginal Remains East of the Mississippi was continued by Mr. D. I. Bushnell, jr., under a small allotment from the bureau, and approximately 90,300 words of manuscript were recorded on cards geographically arranged. The entire amount of manuscript now completed is about 321,000 words, and the bibliography thus far includes 306 titles. As a result of the notes received from the Wisconsin Archeological Society, through the courtesy of its secretary, Mr. Charles E. Brown, of Madison, every county of that State will be well represented in the Handbook. It is to be regretted that more information regard-

ing aboriginal remains is not forthcoming from certain other parts of the country east of the Mississippi, especially the New England States, which at this writing are not adequately represented. The bureau is indebted to Mr. Warren K. Moorehead, of the department of archeology of Phillips Academy, Andover, Mass., for the generous use of original data gathered by him in Maine in advance of its publication by the academy.

Mr. James Murie, as opportunity offered and the limitations of a small allotment made by the bureau for these studies allowed, continued his observations on the ceremonial organization and rites of the Pawnee tribe, of which he is a member. The product of Mr. Murie's investigation of the year, which was practically finished but not received in manuscript form at the close of June, is a circumstantial account of "The Going After the Mother Cedar Tree by the Bear Society," an important ceremony which has been performed only by the Skidi band during the last decade.

In the last annual report attention was directed to a proposed series of handbooks of the Indians of the several States and to the arrangements that had been made for such a volume, devoted to the tribes of California, by Dr. A. L. Kroeber, of the University of California. The author has submitted sections of the manuscript of this work for suggestion, and, although his university duties have delayed its completion, there is every reason to believe that when the material is finished and published it will form an excellent model for the entire series. It has been hoped that the pecuniary means necessary for the preparation of these State handbooks would be provided in accordance with the estimate of an appropriation submitted for this purpose, but unfortunately the desired provision was not made.

Prof. Howard M. Ballou, of Honolulu, has submitted from time to time additional titles for the List of Works Relating to Hawaii, compiled in collaboration with the late Dr. Cyrus Thomas. The material for this bibliography is in the hands of Mr. Felix Neumann for final editorial revision, and it is expected that the entire manuscript will soon be ready for composition.

The large collection of manuscripts in possession of the bureau has been in continuous charge of Mr. J. N. B. Hewitt. A few noteworthy additions were made during the year besides those prepared or which are in process of preparation by members of the staff. Among these may be mentioned the "Dictionary of Words that have been Made Known in or Introduced into English from the Indians of North, Central, and South America," by the late William R. Gerard, a work requiring many years of assiduous labor. The manuscript was acquired for a nominal consideration from Mrs. Gerard, and it is the design to publish the dictionary as soon as it can be given the customary editorial attention. Before his death

Mr. Gerard presented to the bureau an original manuscript of 31 pages, with 21 diagrams, on "Terminations of the Algonquian Transitive and Indefinite Verbs and their Meanings," to which Dr. Truman Michelson has appended a criticism.

Additional manuscripts worthy of special note are the following:

J. P. Dunn: Translation of Miami-Peorla Dictionary, Part 2, *Aller to As-somer*. The original of this dictionary is in the John Carter Brown Library, of Providence, through whose courteous librarian, Mr. George Parker Winship, the bureau has been provided with a photostat copy.

J. P. Dunn: Translation of the History of Genesis, second chapter, from the Miami-Peorla Dictionary above cited.

Cyrus Byington: Manuscript notebook, 1844-1848 and 1861. Kindly presented by Mrs. Eliza Innes, daughter of this noted missionary to the Choctaw.

James A. Giffillan: Chippewa Sentences. A small quarto notebook kindly presented by Miss Emily Cook, of the Office of Indian Affairs.

Parker Marshall: Various memoranda on the location of the Natchez Trace.
H. A. Scomp: Comparative Choctaw and Creek Dictionary, consisting of 1,054 sheets, 20 by 36 inches.

Francisco Pareja: Confessionario, in Spanish and Timuqua. Photostat copy furnished by the courtesy of the New York Historical Society.

Francisco Pareja: Catechismo, in Timuqua. Photostat copy furnished by the courtesy of the New York Historical Society.

Francisco Pareja: Explicacion de la Doctrina, in Timuqua. Photostat copy furnished by the courtesy of the New York Historical Society.

V. C. Fredericksen: Origin of the Eskimo and their Wanderings, with photographs. (The author is a Danish missionary in Greenland.)

From time to time the bureau has been put to considerable expense in having photostat copies made of unique manuscripts and of excessively rare books indispensable to its researches. It is therefore fortunate that the opportunity was afforded, late in the fiscal year, to acquire a photostat apparatus which has since been in constant service. The urgent need of such an instrument was made especially manifest when the Rev. George Worpenberg, S. J., librarian of St. Marys College, St. Marys, Kans., generously accorded the bureau the privilege of copying a number of valuable original linguistic manuscripts in the archives of the college, pertaining chiefly to the Potawatomi and including a dictionary and a grammar recorded by the late Father Maurice Gaillard. Manuscript copies of these voluminous linguistic works could have been made only after infinite labor by an expert and at an expense far exceeding the entire cost of the photostat apparatus. By the close of the year the making of the facsimile reproductions had been commenced by Mr. Albert Sweeney, under the immediate direction of Mr. De Lancey Gill, illustrator.

An opportunity was afforded at the close of the year to replace the wooden partition and ceiling of the manuscript room with terra cotta and to install a fireproof door and window coverings, thus giving for the first time adequate protection to the bureau's large collection of priceless unpublished material.

PUBLICATIONS.

The editorial work of the bureau has been continued by Mr. J. G. Gurley, editor, who has been assisted from time to time by Mrs. Frances S. Nichols. The following publications were received from the press during the year:

Bulletin 53, "Chippewa Music—II," by Frances Densmore.

Bulletin 56, "Ethnzoology of the Tewa Indians," by Junius Henderson and John P. Harrington.

"Coos: An Illustrative Sketch," by Leo J. Frachtenberg. Extract from Handbook of American Indian Languages (*Bulletin 40*), part 2.

The status of other publications, now in press, is as follows:

The proof reading of the *Twenty-ninth Annual Report*, the accompanying paper of which, entitled "Ethnogeography of the Tewa Indians," by John P. Harrington, is an exhaustive memoir presenting many technical difficulties, was nearly completed during the year. About two-thirds of the memoir is in page form.

The *Thirtieth Annual Report* comprised originally, in addition to the administrative section, three memoirs: (1) "Tsimshian Mythology," by Franz Boas; (2) "Ethnobotany of the Zuñi Indians," by Matilda Coxe Stevenson; (3) "An Inquiry into the Animism and Folk-lore of the Guiana Indians," by Walter E. Roth. Extensive additions to the first-named memoir, received after the report had been put into type, necessitated the division of the contents, and accordingly this section was transferred to the *Thirty-first Report*. Approximately two-thirds of "Tsimshian Mythology" has been paged, and the Zuñi memoir also, now the first accompanying paper of the *Thirtieth Annual*, is in process of paging.

To the *Thirty-second Report* will be assigned a memoir entitled "Seneca Myths and Fiction," collected by Jeremiah Curtin and J. N. B. Hewitt and edited with an introduction by the latter, the manuscript of which is about ready for editorial revision.

Bulletin 40 (pt. 2), "Handbook of American Indian Languages." The work on this bulletin has been carried along steadily under the immediate supervision of its editor, Dr. Boas. Two sections—Takelma and Coos—have been issued in separate form (aggregating 429 pages), and two additional sections, dealing with the Chukchee and Siuslaw languages respectively, are in type, the former being "made up" to the extent of about 50 pages.

Bulletin 46, "A Dictionary of the Choctaw Language," by Cyrus Byington (edited by John R. Swanton and Henry S. Halbert). The first (Choctaw-English) section of this work was completed during the year and is practically ready for the press. The manuscript of the second section (English-Choctaw directory), comprising 36,008 entries on cards, was sent to the Printing Office April 30 to June 13, but no proof had been received at the close of the year.

Bulletin 55, "Ethnobotany of the Tewa Indians," by Wilfred W. Robbins, John P. Harrington, and Barbara Freire-Marreco. After this bulletin was in type it was found advisable to incorporate a considerable amount of valuable material, subsequently gathered and kindly offered by Miss Freire-Marreco. The change involved recasting in a large measure the original work. The second galley proof is in the hands of Miss Freire-Marreco for final revision.

Bulletin 57, "An Introduction to the Study of the Maya Hieroglyphs," by Sylvanus Griswold Morley. The manuscript and illustrations of this memoir were submitted to the Public Printer the latter part of April. Engraver's proof of the illustrations, with the exception of a few pieces of color work, have been received and approved. Owing to the heavy pressure of public business, the Printing Office had been unable to furnish proof of the letterpress by the close of the year.

Bulletin 58, "List of Publications of the Bureau of American Ethnology." The page proof of this bulletin is in the hands of the printers for slight correction, preparatory to placing it on the press.

The total number of publications of the bureau distributed during the year was 12,819, classified as follows:

Report volumes and separate papers.....	2,810
Bulletins.....	9,943
Contributions to North American Ethnology.....	22
Introductions.....	5
Miscellaneous publications.....	39
Total.....	12,810

As during several years past the extensive correspondence arising from the constant demand for the publications of the bureau has been in immediate and efficient charge of Miss Helen Munroe and Mr. E. L. Springer, of the Smithsonian Institution, assisted by Mr. Thomas F. Clark, jr. The distribution of publications has been made in accordance with law and with entire satisfaction by the office of the superintendent of documents on order of the bureau.

ILLUSTRATIONS.

The preparation of the illustrations for the publications of the bureau, the making of photographs of the members of delegations of Indians visiting Washington, and the developing and printing of negatives made by the staff of the bureau during the prosecution of their field work have been in charge of Mr. DeLancey Gill, illustrator, assisted successively by Mr. Walter Stenhouse and Mr. Albert Sweeney. In addition the numerous photostat copies of manuscripts and books, aggregating about 2,500 exposures, have been made under Mr. Gill's supervision, as elsewhere mentioned. Of the visiting deputations, rep-

representing 17 tribes, 79 photographic exposures were made; 92 negatives of ethnologic subjects were required for reproduction as illustrations; 512 negatives made by the members of the staff in the field were developed and 381 prints made therefrom; 105 photographs were printed for presentation to Indians and 627 for publication, exchange, and special distribution. In addition to the photographic work, which constitutes the major part of the illustrative material required by the bureau, 54 drawings were made for reproduction.

The series of photographs, representing 55 tribes, which had been exhibited by the New York Public Library and the Public Library Commission of Indiana, was borrowed in June by the Providence Public Library for a similar purpose.

LIBRARY.

The reference library of the bureau, which consists of 19,240 books, about 12,894 pamphlets, and several thousand unbound periodicals, has been in continuous charge of Miss Ella Leary, librarian, assisted by Mrs. Ella Slaughter. During the year 708 books were accessioned, of which 143 were acquired by purchase and 137 by gift and exchange, the remaining 428 being represented by volumes of serials that hitherto had been neither bound nor recorded. The periodicals currently received numbered 629, of which only 16 were obtained by purchase, the remainder being received through exchange. Of pamphlets, 150 were acquired. During the year 1,195 volumes were sent to the bindery and of these 695 were bound and returned to the bureau.

The endeavor to supply deficiencies in the sets of publications of institutions of learning has continued without remission. Among the more important accessions of this kind during the year were *Zeitschrift der Gesellschaft für Erdkunde zu Berlin*, 20 volumes; *Instituto Geografico Argentino, Boletin*, 10 volumes; and *Königliches Museum für Völkerkunde, Veröffentlichungen*, 8 volumes.

The librarian has prepared a monthly bulletin of accessions for the use of the staff, and has furnished information and compiled bibliographic notes for the use of correspondents. In addition to the constant drafts on the library of the bureau requisition was made on the Library of Congress during the year for an aggregate of 300 volumes for official use, and in turn the bureau library was frequently consulted by officers of other Government establishments.

An appropriation having been made by Congress, in behalf of the Institution, for installing modern steel bookstacks in the eastern end of the large exhibition hall on the first floor of the Smithsonian building, and provision having been made for affording the proposed increased facilities to the library of the bureau, which for four and a half years had been installed in the eastern galleries of the hall mentioned, the books therein were removed in February to the gallery

and main floor of the western end of the hall and the eastern galleries were demolished. Although this work of removal occupied two weeks, it was done without confusion and practically without cessation of the library's activities. The new stacks were in process of erection before the close of the fiscal year.

COLLECTIONS.

The following collections were acquired by the bureau or by members of its staff, and, having served the purpose of study, were transferred to the National Museum, as required by law:

Eight fragments of ancient British pottery. Gift to the bureau by Rev. Robert C. Nightingale, Swaffam, Norfolk, England. (55735.)

Potsherds, fragments of human bones, and three heads. Gift to the bureau by Mrs. Bruce Reid, Port Arthur, Tex. (55758.)

Parts of five skeletons (three complete skulls and fragments of two skulls) from a burial cist in a cave about 20 miles south of Grant, N. Mex. Collected by F. W. Hodge, Bureau of American Ethnology. (56134.)

Thirty-one ethnological objects from the Cherokee and Catawba Indians. Collected by James Mooney, Bureau of American Ethnology. (56312.)

Six photographs of Aztec antiquities. Purchased from W. W. Blake, City of Mexico. (56609.)

Stone phallus from Mesa Verde, Colo. Gift to the bureau by H. C. Lay, Telluride, Colo. (56719.)

Arrow point found on the north fork of Roanoke River, about 3 miles from Blacksburg, Va. Gift to the bureau by Prof. Otto C. Burkhart, Virginia Polytechnic Institute, Blacksburg, Va. (56679.)

PROPERTY.

The principal property of the bureau consists of its library, comprising approximately 35,000 books and pamphlets, a large collection of manuscripts for reference or in process of preparation for publication, and several thousand photographic negatives. With the exception of a portion of the library, this material could not be duplicated. In addition, the bureau possesses a photostat apparatus with electric-light equipment, several cameras, dictagraphs, and other appliances for use in conducting scientific research in the field and the office, necessary office furniture and equipment, and a limited supply of stationery, supplies, etc. Also under control of the bureau, but in immediate custody of the Public Printer, as required by law, is a stock of numerous publications, chiefly annual reports and bulletins.

MISCELLANEOUS.

Quarters.—The only improvements made in the quarters occupied by the bureau in the Smithsonian building, as set forth in the last report, have been those incident to the reconstruction of the library and the fireproofing of the manuscript room, above alluded to, and the painting of the walls of four rooms, made necessary partly by

inadequate lighting. In addition to the space previously occupied, a room on the fourth floor of the eastern end of the Smithsonian building was assigned temporarily to the bureau for the use of two members of its staff.

Office force.—The personnel of the office has remained unchanged, with the exception of the resignation of one messenger boy and the appointment of another. It has been necessary to employ a copyist from time to time in connection with the editing of Byington's Choctaw Dictionary. The correspondence of the bureau has been conducted in the same manner as set forth in the last annual report and as hereinbefore mentioned.

Recommendations.—The chief needs of the Bureau of American Ethnology lie in the extension of its researches to fields as yet unexploited. Attention has frequently been called to the necessity of pursuing studies among Indian tribes which are rapidly becoming extinct, or modified by their intimate contact with civilization. These researches can not be conducted unless the means are provided, since the present limited scientific corps, with inadequate allotments of money to meet the expenses of extended field investigations, is not equal to the immense amount of work to be done. Unfortunately many opportunities for conducting these researches which were possible a few years ago have passed away, owing to the death of older Indians who alone possessed certain knowledge of their race. Much can still be done, however, if only the means are afforded.

It is scarcely necessary to repeat, in connection with this general recommendation, the estimate for an increase, amounting to \$24,800, in the appropriation for the bureau and the brief reasons for urging the grant of this additional sum, inasmuch as these items will be found in the printed Estimates of Appropriations, 1915-16.

Respectfully submitted.

F. W. HODGE,
Ethnologist-in-charge.

THE SECRETARY OF THE SMITHSONIAN INSTITUTION.

APPENDIX 3.

REPORT ON THE INTERNATIONAL EXCHANGES.

SIR: I have the honor to submit the following report on the operations of the International Exchange Service during the fiscal year ending June 30, 1914:

The congressional appropriation for the support of the service during the year, including the allotment for printing and binding, was \$32,200 (the same amount as appropriated for the past six years), and the repayments from private and departmental sources for services rendered aggregated \$5,264.18, making the total available resources for carrying on the exchange system \$37,464.18.

During the year 1914 the total number of packages handled was 341,667, an increase of 3,046 as compared with the preceding year. The weight of these packages was 566,985 pounds, a decrease of 26,984 pounds.

The number and weight of the packages of different classes are indicated in the following table:

	Packages.		Weight.	
	Sent.	Received.	Sent.	Received.
			<i>Pounds.</i>	<i>Pounds.</i>
United States parliamentary documents sent abroad.....	131,469		94,759	
Publications received in return for parliamentary documents.....		2,103		9,913
United States departmental documents sent abroad.....	99,826		199,198	
Publications received in return for departmental documents.....		8,994		19,080
Miscellaneous scientific and literary publications sent abroad.....	60,844		130,524	
Miscellaneous scientific and literary publications received from abroad for distribution in the United States.....		38,431		113,511
Total.....	292,139	49,528	424,481	142,504
Grand total.....	341,667		566,985	

In April, 1914, the American-Chinese Publication Exchange Department of the Shanghai Bureau of Foreign Affairs, which was designated a few years ago by the Chinese Government as the depository of the set of United States governmental documents sent to that Government, signified its willingness to accept packages for miscellaneous addresses throughout the Chinese Republic

and forward them to their various destinations. Consignments intended for distribution in China are, therefore, now sent in care of that department instead of the Zi-ka-wei Observatory at Shanghai.

In this connection, it is desired to record here the Institution's appreciation of the valuable service rendered by the Zi-ka-wei Observatory in the distribution of exchanges to correspondents in China for nearly a quarter of a century.

The Smithsonian Institution, through the International Exchange Service, continues to solicit publications for both foreign and domestic governmental and scientific establishments. At the request of the British ambassador, which was referred to this Institution by the Department of State, many United States official publications were procured for the various Canadian departments and bureaus. As formerly, aid has been rendered the Library of Congress in obtaining from foreign Governments certain documents especially desired for its collections.

Of the 2,465 boxes used in forwarding exchanges to foreign agencies for distribution, 280 boxes contained full sets of United States official documents for authorized depositories and 2,185 were filled with departmental and other publications for depositories of partial sets and for miscellaneous correspondents. The number of boxes sent to each foreign country and the dates of transmission are shown in the following table:

Consignments of exchanges for foreign countries.

Country.	Number of boxes.	Date of transmission.
ARGENTINA.....	45	July 28, Aug. 22, Sept. 30, Oct. 27, Nov. 29, 1913; Jan. 20, Feb. 26, Apr. 9, June 3, 1914.
AUSTRIA.....	91	July 16, Aug. 12, Sept. 17, Oct. 15, Nov. 12, Dec. 10, 1913; Jan. 14, Feb. 18, Mar. 18, Apr. 17, May 19, June 17, 1914.
BELGIUM.....	64	July 19, Aug. 8, Sept. 5, 27, Oct. 11, Nov. 8, 29, Dec. 20, 1913; Jan. 24, Feb. 19, Mar. 21, Apr. 23, May 21, June 29, 1914.
BOLIVIA.....	6	July 30, Oct. 4, Nov. 26, 1913; Feb. 4, Mar. 7, June 30, 1914.
BRAZIL.....	32	July 28, Aug. 22, Sept. 30, Oct. 27, Nov. 29, 1913; Jan. 20, Feb. 26, Apr. 9, June 3, 1914.
BRITISH COLONIES....	20	July 18, Aug. 2, 23, Sept. 6, 20, Oct. 10, 24, Nov. 14, 21, Dec. 5, 1913; Jan. 10, 24, Feb. 6, Mar. 14, Apr. 4, 18, May 2, 24, June 6, 27, 1914.
BRITISH GUIANA.....	4	Nov. 5, Dec. 17, 1913; Mar. 14, June 30, 1914.
BULGARIA.....	6	Oct. 23, Nov. 25, 1913; Feb. 7, Mar. 14, May 14, June 24, 1914.
CANADA.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
CHILE.....	23	July 29, Aug. 3, Sept. 30, Oct. 27, Nov. 28, 1913; Jan. 20, Feb. 27, Apr. 17, June 4, 1914.
CHINA.....	38	July 30, Aug. 31, Sept. 30, Nov. 15, 1913; Jan. 8, Mar. 9, Apr. 29, May 21, June 16, 1914.
COLOMBIA.....	16	July 30, Nov. 26, 1913; Jan. 21, May 14, June 24, 1914.
COSTA RICA.....	16	July 30, Oct. 6, Nov. 26, 1913; Jan. 21, Mar. 7, May 28, June 30, 1914.
CUBA.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
DENMARK.....	40	July 22, Aug. 19, Sept. 23, Oct. 21, Nov. 19, Dec. 20, 1913; Jan. 29, Feb. 21, Mar. 26, Apr. 24, May 27, June 25, 1914.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
ECUADOR.....	7	July 30, Oct. 6, Nov. 26, 1913; Feb. 4, Mar. 7, May 21, June 30, 1914.
EGYPT.....	11	Sept 11, Oct. 25, Nov. 29, Dec. 30, 1913; Jan. 23, Feb. 21, Apr. 3, 28, June 10, 1914.
FRANCE.....	180	July 10, 31, Aug. 14, 28, Sept. 18, Oct. 8, 29, Nov. 19, Dec. 3, 24, 1913; Jan. 14, Feb. 4, 18, Mar. 11, Apr. 8, May 6, June 10, 1914.
GERMANY.....	433	July 1, 8, 15, 22, 29, 30, Aug. 5, 12, 19, 26, 29, Sept. 2, 9, 16, 23, 30, Oct. 7, 14, 21, 28, Nov. 4, 11, 19, 25, Dec. 2, 9, 16, 23, 30, 1913; Jan. 6, 13, 20, 27, Feb. 3, 10, 17, 24, Mar. 3, 10, 17, 24, 30, Apr. 7, 15, 28, May 5, 12, 26, June 2, 16, 23, 30, 1914.
GREAT BRITAIN AND IRELAND.	448	July 12, 18, 25, Aug. 2, 8, 15, 23, 29, Sept. 6, 12, 20, 26, Oct. 3, 10, 17, 24, Nov. 1, 7, 14, 21, 29, Dec. 5, 12, 19, 27, 1913; Jan. 3, 10, 17, 24, 31, Feb. 6, 13, 20, 27, Mar. 6, 14, 20, 27, Apr. 4, 11, 18, 25, May 2, 9, 23, June 1, 6, 13, 20, 26, 1914.
GREECE.....	16	July 22, Aug. 23, Sept. 25, Oct. 13, Dec. 17, 1913; Jan. 31, Mar. 7, May 15, June 23, 1914.
GUATEMALA.....	7	July 30, Oct. 6, Nov. 28, 1913; Feb. 4, Mar. 7, May 21, June 30, 1914.
HAWAII.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
HONDURAS.....	5	Aug. 28, Nov. 15, 1913; Feb. 5, Mar. 7, June 12, 1914.
HUNGARY.....	39	July 16, Aug. 12, Sept. 17, Nov. 12, Dec. 10, 1913; Jan. 14, Feb. 18, Mar. 18, Apr. 17, May 19, June 17, 1914.
INDIA.....	50	July 12, 18, 25, Aug. 2, 15, 23, Sept. 6, 20, 26, Oct. 10, 17, 24, Nov. 14, Dec. 5, 19, 1913; Jan. 3, 10, 24, Feb. 6, 13, 20, Mar. 6, 14, 20, 27, Apr. 11, 25, May 2, 23, June 6, 20, 25, 1914.
ITALY.....	86	Aug. 7, Sept. 11, 27, Oct. 11, 25, Nov. 8, 29, Dec. 30, 1913; Jan. 23, Feb. 21, Mar. 7, Apr. 28, June 30, 1914.
JAMAICA.....	7	Aug. 27, Oct. 30, Nov. 29, Dec. 7, 1913; Mar. 20, June 12, 25, 1914.
JAPAN.....	54	July 24, Aug. 20, Sept. 24, Oct. 23, Nov. 25, Dec. 20, 1913; Jan. 27, Feb. 24, Apr. 28, June 5, 1914.
KOREA.....	4	Aug. 27, Oct. 31, 1913; Feb. 7, June 12, 1914.
LIBERIA.....	5	July 31, Oct. 31, Nov. 29, 1913; Mar. 7, May 14, 1914.
LOURENÇO MARQUEZ.	4	Aug. 27, Dec. 17, 1913; June 18, 1914.
MAINTORA.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
MEXICO.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
MONTENEGRO.....	2	Dec. 17, 1913; June 18, 1914.
NETHERLANDS.....	61	July 15, Aug. 5, 26, Sept. 23, Oct. 14, 28, Nov. 18, Dec. 16, 1913; Jan. 6, Feb. 3, 24, Mar. 24, Apr. 21, May 12, June 9, 1914.
NEWFOUNDLAND.....	2	Jan. 5, June 30, 1914.
NEW SOUTH WALES..	31	July 24, Aug. 20, Sept. 25, Oct. 23, Nov. 22, Dec. 23, 1913; Jan. 27, Feb. 25, Mar. 25, May 7, June 12, 1914.
NEW ZEALAND.....	25	July 24, Aug. 20, Sept. 25, Oct. 23, Nov. 25, Dec. 23, 1913; Jan. 29, Feb. 25, Mar. 27, May 7, June 16, 1914.
NICARAGUA.....	5	Aug. 28, Nov. 15, 1913; Feb. 5, Mar. 7, June 12, 1914.
NORWAY.....	31	July 22, Aug. 19, Sept. 23, Oct. 21, Nov. 19, Dec. 20, 1913; Jan. 30, Feb. 21, Mar. 25, Apr. 24, May 28, June 25, 1914.
ONTARIO.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
PALESTINE.....	7	Sept. 30, 1913.
PARAGUAY.....	5	Aug. 28, Nov. 15, 1913; Feb. 4, May 15, June 30, 1914.
PERU.....	16	July 29, Aug. 22, Sept. 30, Oct. 27, Nov. 29, 1913; Jan. 20, Feb. 27, June 4, 1914.
PORTUGAL.....	23	July 22, Aug. 19, Sept. 23, Oct. 21, Nov. 19, Dec. 20, 1913; Jan. 30, Feb. 21, Mar. 25, Apr. 24, May 28, June 25, 1914.
QUEBEC.....	5	Sept. 22, 1913; Jan. 12, Feb. 21, Apr. 14, May 12, 1914.
QUEENSLAND.....	13	July 24, Aug. 20, Sept. 25, Oct. 23, Nov. 25, Dec. 23, 1913; Jan. 29, Feb. 25, Mar. 27, May 7, June 16, 1914.

Consignments of exchanges for foreign countries—Continued.

Country.	Number of boxes.	Date of transmission.
ROUMANIA.....	13	July 31, Aug. 30, Sept. 25, Oct. 23, Nov. 29, 1913; Feb. 7, Mar. 12, May 14, June 24, 1914.
RUSSIA.....	92	July 17, Aug. 13, Sept. 18, Oct. 16, Nov. 13, Dec. 11, 1913; Jan. 16, 24, Feb. 19, Mar. 19, May 20, June 18, 1914.
SALVADOR.....	8	July 30, Oct. 6, 24, Nov. 28, 1913; Feb. 4, Mar. 7, June 12, 1914.
SERVIA.....	13	July 17, Sept. 25, Nov. 15, 1913; Jan. 21, Mar. 7, May 28, June 24, 1914.
SIAM.....	5	Aug. 27, Nov. 29, 1913; Feb. 7, Mar. 28, June 30, 1914.
SOUTH AUSTRALIA.....	18	July 24, Aug. 20, Sept. 25, Oct. 23, Nov. 25, Dec. 23, 1913; Jan. 28, Feb. 25, Mar. 27, May 7, June 15, 1914.
SPAIN.....	30	Aug. 7, Sept. 11, Oct. 25, Nov. 29, Dec. 30, 1913; Jan. 23, Feb. 21, Apr. 3, June 10, 1914.
SWEDEN.....	72	July 17, Aug. 14, Sept. 18, Oct. 16, Nov. 13, Dec. 11, 1913; Jan. 16, Feb. 19, Mar. 19, Apr. 20, May 20, June 18, 1914.
SWITZERLAND.....	54	July 19, Aug. 7, Sept. 5, 27, Oct. 11, Nov. 8, 29, Dec. 20, 1913; Jan. 34, Feb. 19, Mar. 21, Apr. 23, May 21, June 19, 1914.
SYRIA.....	6	Apr. 26, May 27, June 25, 1914.
TASMANIA.....	12	Aug. 2, 23, Sept. 6, 20, Oct. 24, Nov. 14, Dec. 19, 1913; Feb. 13, Apr. 11, 25, June 25, 1914.
TRINIDAD.....	3	Mar. 7, 30, June 12, 1914.
TURKEY.....	14	Aug. 30, Sept. 30, Oct. 23, Nov. 15, 1913; Jan. 8, 23, Feb. 28, Mar. 7, Apr. 30, May 27, June 25, 1914.
UNION OF SOUTH AFRICA.....	24	Sept. 25, Oct. 31, Nov. 29, 1913; Jan. 26, Feb. 28, May 13, June 23, 1914.
URUGUAY.....	21	July 29, Aug. 22, Oct. 4, Nov. 26, 1913; Jan. 21, Feb. 27, June 4, 1914.
VENEZUELA.....	11	Oct. 4, Nov. 26, 1913; Jan. 21, Mar. 7, May 28, June 30, 1914.
VICTORIA.....	29	July 24, Aug. 20, Sept. 25, Oct. 23, Nov. 22, Dec. 23, 1913; Jan. 28, Feb. 25, Mar. 27, May 7, June 15, 1914.
WESTERN AUSTRALIA.....	24	July 12, 25, Aug. 23, Sept. 6, 20, Oct. 3, 17, 24, Nov. 21, Dec. 5, 19, 1913; Jan. 10, 24, Feb. 6, 20, Mar. 6, 20, Apr. 4, June 13, 1914.
WINDWARD AND LEEWARD ISLANDS.....	3	Oct. 31, 1913; Feb. 7, June 12, 1914.

In October, 1913, the New York forwarding agents informed the Institution that boxes 1179 and 1598, which were sent to them under date of March 28 and May 15, 1913, respectively, for transmission to his Japanese Majesty's residency general at Seoul, Korea, had been lost in transit by the steamship company. These consignments contained publications from both governmental and scientific establishments for distribution to Korean correspondents, and duplicates of as many of them as were available for distribution were obtained and forwarded to their destinations.

FOREIGN DEPOSITORIES OF UNITED STATES GOVERNMENTAL DOCUMENTS.

No additions were made to the foreign depositories of full or partial sets during the year, 56 full sets of United States official publications and 36 partial sets now being forwarded regularly to designated depositories abroad.

The recipients of full and partial sets are as follows:

DEPOSITORIES OF FULL SETS.

- ARGENTINA:** Ministerio de Relaciones Exteriores, Buenos Aires.
AUSTRALIA: Library of the Commonwealth Parliament, Melbourne.
AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.
BADEN: Universitäts-Bibliothek, Freiburg. (Depository of the Grand Duchy of Baden.)
BAVARIA: Königliche Hof- und Staats-Bibliothek, Munich.
BELGIUM: Bibliothèque Royale, Brussels.
BOMBAY: Secretary to the Government, Bombay.
BRAZIL: Bibliotheca Nacional, Rio de Janeiro.
BUENOS AIRES: Biblioteca de la Universidad Nacional de La Plata. (Depository of the Province of Buenos Aires.)
CANADA: Library of Parliament, Ottawa.
CHILE: Biblioteca del Congreso Nacional, Santiago.
CHINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
COLOMBIA: Biblioteca Nacional, Bogota.
COSTA RICA: Oficina de Depósito y Canje Internacional de Publicaciones, San José.
CUBA: Secretaría de Estado (Asuntos Generales y Canje Internacional), Habana.
DENMARK: Kongelige Bibliothek, Copenhagen.
ENGLAND: British Museum, London.
FRANCE: Bibliothèque Nationale, Paris.
GERMANY: Deutsche Reichstags-Bibliothek, Berlin.
GLASGOW: City Librarian, Mitchell Library, Glasgow.
GREECE: Bibliothèque Nationale, Athens.
HAITI: Secrétairerie d'État des Relations Extérieures, Port au Prince.
HUNGARY: Hungarian House of Delegates, Budapest.
INDIA: Department of Education (Books), Government of India, Calcutta.
IRELAND: National Library of Ireland, Dublin.
ITALY: Biblioteca Nazionale Vittorio Emanuele, Rome.
JAPAN: Imperial Library of Japan, Tokyo.
LONDON: London School of Economics and Political Science. (Depository of the London County Council.)
MANITOBA: Provincial Library, Winnipeg.
MEXICO: Instituto Bibliográfico, Biblioteca Nacional, Mexico.
NETHERLANDS: Library of the States General, The Hague.
NEW SOUTH WALES: Public Library of New South Wales, Sydney.
NEW ZEALAND: General Assembly Library, Wellington.
NORWAY: Storthingets Bibliothek, Christiania.
ONTARIO: Legislative Library, Toronto.
PARIS: Préfecture de la Seine.
PERU: Biblioteca Nacional, Lima.
PORTUGAL: Bibliotheca Nacional, Lisbon.
PRUSSIA: Königliche Bibliothek, Berlin.
QUEBEC: Library of the Legislature of the Province of Quebec, Quebec.
QUEENSLAND: Parliamentary Library, Brisbane.
RUSSIA: Imperial Public Library, St. Petersburg.
SAXONY: Königliche Oeffentliche Bibliothek, Dresden.
SERVIA: Section Administrative du Ministère des Affaires Étrangères, Belgrade.
SOUTH AUSTRALIA: Parliamentary Library, Adelaide.

SPAIN: Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
 SWEDEN: Kungliga Biblioteket, Stockholm.
 SWITZERLAND: Bibliothèque Fédérale, Berne.
 TASMANIA: Parliamentary Library, Hobart.
 TURKEY: Department of Public Instruction, Constantinople.
 UNION OF SOUTH AFRICA: State Library, Pretoria, Transvaal.
 URUGUAY: Oficina de Canje Internacional de Publicaciones, Montevideo.
 VENEZUELA: Biblioteca Nacional, Caracas.
 VICTORIA: Public Library, Melbourne.
 WESTERN AUSTRALIA: Public Library of Western Australia, Perth.
 WÜRTTEMBERG: Königliche Landesbibliothek, Stuttgart.

DEPOSITORIES OF PARTIAL SETS.

ALBERTA: Provincial Library, Edmonton.
 ALSACE-LORRAINE: K. Ministerium für Elsass-Lothringen, Strassburg.
 BOLIVIA: Ministerio de Colonización y Agricultura, La Paz.
 BREMEN: Senatskommission für Reichs- und Auswärtige Angelegenheiten.
 BRITISH COLUMBIA: Legislative Library, Victoria.
 BRITISH GUIANA: Government Secretary's Office, Georgetown, Demerara.
 BULGARIA: Minister of Foreign Affairs, Sofia.
 CEYLON: United States Consul, Colombo.
 ECUADOR: Biblioteca Nacional, Quito.
 EGYPT: Bibliothèque Khédiviale, Cairo.
 FINLAND: Chancery of Governor, Helsingfors.
 GUATEMALA: Secretary of the Government, Guatemala.
 HAMBURG: Senatskommission für die Reichs- und Auswärtigen Angelegenheiten.
 HESSE: Grossherzogliche Hof-Bibliothek, Darmstadt.
 HONDURAS: Secretary of the Government, Tegucigalpa.
 JAMAICA: Colonial Secretary, Kingston.
 LIBERIA: Department of State, Monrovia.
 LOURENÇO MARQUEZ: Government Library, Lourenço Marquez.
 LÜBECK: President of the Senate.
 MADRAS, PROVINCE OF: Chief Secretary to the Government of Madras, Public Department, Madras.
 MALTA: Lieutenant Governor, Valetta.
 MONTENEGRO: Ministère des Affaires Étrangères, Cetinje.
 NEW BRUNSWICK: Legislative Library, Fredericton.
 NEWFOUNDLAND: Colonial Secretary, St. John's.
 NICARAGUA: Superintendente de Archivos Nacionales, Managua.
 NORTHWEST TERRITORIES: Government Library, Regina.
 NOVA SCOTIA: Provincial Secretary of Nova Scotia, Halifax.
 PANAMA: Secretaría de Relaciones Exteriores, Panama.
 PARAGUAY: Oficina General de Inmigración, Asunción.
 PRINCE EDWARD ISLAND: Legislative Library, Charlottetown.
 ROMANIA: Academia Romana, Bucharest.
 SALVADOR: Ministerio de Relaciones Exteriores, San Salvador.
 SIAM: Department of Foreign Affairs, Bangkok.
 STRAITS SETTLEMENTS: Colonial Secretary, Singapore.
 UNITED PROVINCES OF AGRA AND OUDH: Under Secretary to Government, Allahabad.
 VIENNA: Bürgermeister der Haupt- und Residenz-Stadt.

INTERPARLIAMENTARY EXCHANGE OF OFFICIAL JOURNALS.

A list of the countries which have entered into interparliamentary exchange of official journals with the United States is given below:

Argentine Republic.	Italy.
Australia.	Liberia.
Austria.	New South Wales.
Baden.	New Zealand.
Belgium.	Portugal.
Brazil.	Prussia.
Buenos Aires, Province of.	Queensland.
Canada.	Roumania.
Cuba.	Russia.
Denmark.	Servia.
France.	Spain.
Great Britain.	Switzerland.
Greece.	Transvaal.
Guatemala.	Union of South Africa.
Honduras.	Uruguay.
Hungary.	Western Australia.

As will be noted, there are at present 32 countries with which the immediate exchange is conducted, no additions having been made during the year.

LIST OF BUREAUS OR AGENCIES THROUGH WHICH EXCHANGES ARE TRANSMITTED.

The following is a list of the bureaus or agencies through which exchanges are transmitted:

- ALGERIA, *via* France.
 ANGOLA, *via* Portugal.
 ARGENTINA: Comisión Protectora de Bibliotecas Populares, Reconquista 538, Buenos Aires.
 AUSTRIA: K. K. Statistische Zentral-Kommission, Vienna.
 AZORES, *via* Portugal.
 BELGIUM: Service Belge des Échanges Internationaux, Rue des Longs-Charlots 46, Brussels.
 BOLIVIA: Oficina Nacional de Estadística, La Paz.
 BRAZIL: Serviço de Permutações Internacionais, Bibliotheca Nacional, Rio de Janeiro.
 BRITISH COLONIES: Crown Agents for the Colonies, London.¹
 BRITISH GUIANA: Royal Agricultural and Commercial Society, Georgetown.
 BRITISH HONDURAS: Colonial Secretary, Belize.
 BULGARIA: Institutions Scientifiques de S. M. le Roi de Bulgarie, Sofia.
 CANARY ISLANDS, *via* Spain.
 CHILE: Servicio de Canjes Internacionales, Biblioteca Nacional, Santiago.
 CHINA: American-Chinese Publication Exchange Department, Shanghai Bureau of Foreign Affairs, Shanghai.
 COLOMBIA: Oficina de Canjes Internacionales y Reparto, Biblioteca Nacional, Bogota.

¹ This method is employed for communicating with several of the British colonies with which no medium is available for forwarding exchanges direct.

- COSTA RICA:** Oficina de Depósito y Canje Internacional de Publicaciones, San José.
- DENMARK:** Kongelige Danske Videnskabernes Selskab, Copenhagen.
- DUTCH GUIANA:** Surinaamsche Koloniale Bibliotheek, Paramaribo.
- ECUADOR:** Ministerio de Relaciones Exteriores, Quito.
- EGYPT:** Government Publications Office, Printing Department, Cairo.
- FRANCE:** Service Français des Échanges Internationaux, 110 Rue de Grenelle, Paris.
- GERMANY:** Amerika-Institut, Berlin, N. W. 7.
- GREAT BRITAIN AND IRELAND:** Messrs. William Wesley & Son, 28 Essex Street, Strand, London.
- GREECE:** Bibliothèque Nationale, Athens.
- GREENLAND,** *via* Denmark.
- GUADELOUPE,** *via* France.
- GUATEMALA:** Instituto Nacional de Varones, Guatemala.
- GUINEA,** *via* Portugal.
- HAITI:** Secrétaire d'État des Relations Extérieures, Port au Prince.
- HONDURAS:** Biblioteca Nacional, Tegucigalpa.
- HUNGARY:** Dr. Julius Pikler, Municipal Office of Statistics, Váci-utca 80, Budapest.
- ICELAND,** *via* Denmark.
- INDIA:** India Store Department, India Office, London.
- ITALY:** Ufficio degli Scambi Internazionali, Biblioteca Nazionale Vittorio Emanuele, Rome.
- JAMAICA:** Institute of Jamaica, Kingston.
- JAPAN:** Imperial Library of Japan, Tokyo.
- JAVA,** *via* Netherlands.
- KOREA:** His Imperial Japanese Majesty's Residency-General, Seoul.
- LIBERIA:** Bureau of Exchanges, Department of State, Monrovia.
- LOURENÇO MARQUEZ:** Government Library, Lourenço Marquez.
- LUXEMBURG,** *via* Germany.
- MADAGASCAR,** *via* France.
- MADEIRA,** *via* Portugal.
- MONTENEGRO:** Ministère des Affaires Étrangères, Cetinje.
- MOZAMBIQUE,** *via* Portugal.
- NETHERLANDS:** Bureau Scientifique Central Néerlandais, Bibliothèque de l'Université, Leyden.
- NEW GUINEA,** *via* Netherlands.
- NEW SOUTH WALES:** Public Library of New South Wales, Sydney.
- NEW ZEALAND:** Dominion Museum, Wellington.
- NICARAGUA:** Ministerio de Relaciones Exteriores, Managua.
- NORWAY:** Kongelige Norske Frederiks Universitet Bibliotheket, Christiania.
- PANAMA:** Secretaria de Relaciones Exteriores, Panama.
- PARAGUAY:** Ministerio de Relaciones Exteriores, Asuncion.
- PEBSIA:** Board of Foreign Missions of the Presbyterian Church, New York City.
- PERU:** Oficina de Reparto, Depósito y Canje Internacional de Publicaciones, Ministerio de Fomento, Lima.
- PORTUGAL:** Serviço de Permutações Internacionais, Bibliotheca Nacional, Lisbon.
- QUEENSLAND:** Bureau of Exchanges of International Publications, Chief Secretary's Office, Brisbane.
- ROUMANIA:** Academia Romana, Bucharest.
- RUSSIA:** Commission Russe des Échanges Internationaux, Bibliothèque Impériale Publique, St. Petersburg.
- SALVADOR:** Ministerio de Relaciones Exteriores, San Salvador.

SERBIA : Section Administrative du Ministère des Affaires Étrangères, Belgrade.
SIAM : Department of Foreign Affairs, Bangkok.
SOUTH AUSTRALIA : Public Library of South Australia, Adelaide.
SPAIN : Servicio del Cambio Internacional de Publicaciones, Cuerpo Facultativo de Archiveros, Bibliotecarios y Arqueólogos, Madrid.
SUMATRA, *via* Netherlands.
SWEDEN : Kongliga Svenska Vetenskaps Akademien, Stockholm.
SWITZERLAND : Service des Échanges Internationaux, Bibliothèque Fédérale Centrale, Berne.
SYRIA : Board of Foreign Missions of the Presbyterian Church, New York.
TASMANIA : Secretary to the Premier, Hobart.
TRINIDAD : Royal Victoria Institute of Trinidad and Tobago, Port-of-Spain.
TUNIS, *via* France.
TURKEY : American Board of Commissioners for Foreign Missions, Boston.
UNION OF SOUTH AFRICA : Government Printing Works, Pretoria, Transvaal.
URUGUAY : Oficina de Canje Internacional, Montevideo.
VENEZUELA : Biblioteca Nacional, Caracas.
VICTORIA : Public Library of Victoria, Melbourne.
WESTERN AUSTRALIA : Public Library of Western Australia, Perth.
WINDWARD AND LEEWARD ISLANDS : Imperial Department of Agriculture, Bridgetown, Barbados.

It is my sad duty to record here the death on June 25, 1914, of Dr. F. W. True, the Assistant Secretary in charge of Library and Exchanges. Dr. True was in charge of the exchanges a little over three years, having been appointed June 11, 1911. His official connection with the Institution, however, dates from 1881. During his incumbency Dr. True took special steps to increase the efficiency of the Exchange Service. Recently he addressed communications to the chiefs of the various foreign exchange bureaus and establishments acting as distributing agencies, requesting them to furnish him with certain statistical information regarding the exchanges carried on under their supervision for use in connection with the preparation of an article on the present condition of the International Exchange Service throughout the world which he had under way.

Respectfully submitted.

C. W. SHOEMAKER,

Chief Clerk International Exchange Service.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

AUGUST 5, 1914.

APPENDIX 4.

REPORT ON THE NATIONAL ZOOLOGICAL PARK.

SIR: I have the honor to submit herewith a report concerning the operation of the National Zoological Park during the fiscal year ending June 30, 1914.

By the sundry civil act approved June 23, 1913, Congress allowed \$100,000 for improvement and maintenance. The cost of food for the animals during the year was \$23,200, an increase of about \$3,000; considerable repairs were required to some of the older buildings, and a large amount of damage on the grounds was done by a heavy storm. The amount remaining available for improvement and expansion therefore was proportionately reduced.

ACCESSIONS.

The most important accessions were a male hippopotamus, a pair of young Bengal tigers, a pair of young lions, a sable antelope, and an American white crane. The animals mentioned in the last annual report as on their way from the Government Zoological Garden at Giza, Egypt, arrived early in the present fiscal year. Among them were a pair of young African elephants and a pair of cheetahs. The total expended for the purchase and transportation of animals was \$7,450, which includes \$1,900 paid for bringing over the animals from Giza.

Mammals and birds were born and hatched in the park to the number of 95, including bears of four species, an otter, five mink, several monkeys, a llama, a chamois, an Arabian gazelle, various deer, two American white pelicans, and some other mammals and birds.

EXCHANGES.

Comparatively few exchanges were made during the year. Among animals obtained by this means were a leopard, a Japanese bear, a white-tailed gnu, several other mammals, and a few birds and large snakes.

GIFTS.

Miss M. H. Berger, Washington, D. C., an alligator.

Mr. Walter Brown, Washington, D. C., a broad-winged hawk.

Dr. D. E. Buckingham, Washington, D. C., a coyote.

Mrs. Charlotte Buford, Washington, D. C., a red-fronted parrot.
 Mrs. M. E. Butler, Washington, D. C., a Belgian hare.
 Mr. Walter Campbell, Alexandria, Va., a woodchuck.
 Mrs. C. E. Clark, Washington, D. C., a finch.
 Mrs. Thomas W. Coskery, Flemingsburg, Ky., a bald eagle.
 Mrs. Ida M. Dalton, Washington, D. C., a broad-winged hawk.
 Miss Elizabeth Eccleston, Forest Glen, Md., a common ferret.
 Lieut. J. H. Everson, United States Navy, a roseate spoonbill.
 Mr. W. L. Field, Washington, D. C., a Gila monster.
 Capt. S. S. Flower, Giza, Egypt, an Arabian baboon.
 Mrs. Elsie Frizzell, Washington, D. C., an American magpie.
 Mr. F. P. Hall, Washington, D. C., a muscovy duck.
 Mr. Hugh G. Harp, Bluemont, Va., a Cooper's hawk.
 Mr. Hendley, Washington, D. C., a brown capuchin.
 Mrs. C. B. Hight, Washington, D. C., an alligator.
 Miss Barbara Hubbard, Washington, D. C., three common canaries.
 Mrs. Hughes, Washington, D. C., a goldfinch.
 Mr. C. E. Hunt, Washington, D. C., a cardinal and four doves.
 Mrs. Lieber, Philadelphia, Pa., an alligator.
 Miss Annie C. Linn, Alexandria, Va., a raccoon.
 Asst. Paymaster Stanley Mathes, United States Navy, a paca.
 Miss Maria I. McCormack, Washington, D. C., a Cuban parrot.
 Mr. E. B. McLean, Washington, D. C., a peafowl.
 Mr. Mills, Washington, D. C., a common canary.
 Mr. A. M. Nicholson, Orlando, Fla., 12 young water moccasins.
 Mr. R. G. Payne, Washington, D. C., a hog-nosed snake.
 Mr. W. W. Reese, Ironton, Va., a bittern.
 Mr. Peter Simon, Washington, D. C., a hog-nosed snake.
 Mr. J. T. Smoot, Smoot, W. Va., a horned owl.
 Mr. Andreas Soto, Cape San Antonio, Cuba, two white-headed doves.
 Hon. William J. Stone, United States Senate, a raccoon.
 Mr. F. A. Thackery, Sacaton, Ariz., a spotted lynx, two Gila monsters, and a
 horned lizard.
 Mr. H. W. Wheeler, Street, Md., a black snake.
 Hon. Woodrow Wilson, Washington, D. C., three opossums.
 Unknown donor, a pigeon hawk.

LOSSES.

The losses were distributed throughout the collection, the more important being a lion, a cougar, a guanaco, a gazelle, and an Arabian baboon which died from pneumonia; an East African buffalo, a gnu, a mandrill, and a Malay bear from tuberculosis; two lions, a tiger, a moose, and an American bison from gastritis and enteritis; a rhea, a sarus crane, a flamingo, and a great bustard from aspergillosis; and several mammals and birds as the result of fighting and accidents. A number of birds were killed by predatory animals living at large in the park.

Such of the dead animals as were of value for study or for other museum purposes were transferred to the National Museum to the number of 88. Autopsies were made, as usual, by the Pathological

Division of the Bureau of Animal Industry, Department of Agriculture.¹

ANIMALS IN THE COLLECTION JUNE 30, 1914.

MAMMALS.

Green monkey (<i>Cercopithecus callitrichus</i>)	1	Gray wolf (<i>Canis occidentalis</i>)	4
Mona monkey (<i>Cercopithecus mona</i>)	2	Coyote (<i>Canis latrans</i>)	4
Diana monkey (<i>Cercopithecus diana</i>)	1	Woodhouse's coyote (<i>Canis frustror</i>)	3
Sooty mangabey (<i>Cercocebus fuliginosus</i>)	1	Red fox (<i>Vulpes pennsylvanicus</i>)	5
Bonnet monkey (<i>Macacus sinicus</i>)	1	Swift fox (<i>Vulpes velox</i>)	2
Macaque monkey (<i>Macacus cynomolgus</i>)	2	Arctic fox (<i>Vulpes lagopus</i>)	1
Pig-tailed monkey (<i>Macacus nemestrinus</i>)	5	Gray fox (<i>Urocyon cinereo-argenteus</i>)	5
Rhesus monkey (<i>Macacus rhesus</i>)	15	Spotted hyena (<i>Hyena crocuta</i>)	1
Brown macaque (<i>Macacus arctoides</i>)	3	African palm civet (<i>Viverra zibetha</i>)	1
Japanese monkey (<i>Macacus fuscatus</i>)	1	Common genet (<i>Genetta genetta</i>)	2
Black ape (<i>Cynopithecus niger</i>)	1	Cheetah (<i>Cynailurus jubatus</i>)	2
Chacma (<i>Papio porcarius</i>)	1	Sudan lion (<i>Felis leo</i>)	3
Hamadryas baboon (<i>Papio hamadryas</i>)	1	Killmanjaro lion (<i>Felis leo sababensis</i>)	2
Mandrill (<i>Papio maimon</i>)	3	Tiger (<i>Felis tigris</i>)	2
Gray spider monkey (<i>Ateles geoffroyi</i>)	1	Cougar (<i>Felis oncinus</i>)	1
White-throated capuchin (<i>Cebus hypoleucos</i>)	1	Jaguar (<i>Felis onca</i>)	1
Brown monkey (<i>Cebus fatuellus</i>)	1	Leopard (<i>Felis pardus</i>)	3
Durukuli (<i>Nyctipithecus trivirgatus</i>)	1	Black leopard (<i>Felis pardus</i>)	1
Mongoose lemur (<i>Lemur mongoos</i>)	1	Canada lynx (<i>Lynx canadensis</i>)	1
Ring-tailed lemur (<i>Lemur catta</i>)	2	Bay lynx (<i>Lynx rufus</i>)	8
Garnett's galago (<i>Galago garnettii</i>)	1	Spotted lynx (<i>Lynx rufus texensis</i>)	2
Polar bear (<i>Thalarctos maritimus</i>)	2	Florida lynx (<i>Lynx rufus floridanus</i>)	1
European brown bear (<i>Ursus arctos</i>)	2	Steller's sea lion (<i>Eumetopias stelleri</i>)	1
Kadiak bear (<i>Ursus middendorffi</i>)	1	California sea lion (<i>Zalophus californianus</i>)	2
Yakutat bear (<i>Ursus dalli</i>)	1	Northern fur seal (<i>Callotaria alascanus</i>)	1
Alaskan brown bear (<i>Ursus gyas</i>)	3	Harbor seal (<i>Phoca vitulina</i>)	2
Kidder's bear (<i>Ursus kiddlei</i>)	2	Fox squirrel (<i>Sciurus niger</i>)	9
Himalayan bear (<i>Ursus thibetanus</i>)	1	Western fox squirrel (<i>Sciurus ludovicianus</i>)	8
Japanese bear (<i>Ursus japonicus</i>)	1	Gray squirrel (<i>Sciurus carolinensis</i>)	40
Grizzly bear (<i>Ursus horribilis</i>)	3	Black squirrel (<i>Sciurus carolinensis</i>)	20
Black bear (<i>Ursus americanus</i>)	9	Albino squirrel (<i>Sciurus carolinensis</i>)	1
Cinnamon bear (<i>Ursus americanus</i>)	2	Prairie dog (<i>Cynomys ludovicianus</i>)	54
Sloth bear (<i>Melursus ursinus</i>)	1	Albino woodchuck (<i>Arctomys monas</i>)	1
Kinkajou (<i>Cercopithecus caudivolvulus</i>)	1	Alpine marmot (<i>Arctomys marmotta</i>)	1
Cacomistle (<i>Bassariscus astuta</i>)	1	American beaver (<i>Castor canadensis</i>)	6
Gray coatimundi (<i>Nasua narica</i>)	5	Hutia-conga (<i>Capromys pilorides</i>)	1
Raccoon (<i>Procyon lotor</i>)	10	Indian porcupine (<i>Hystrix leucura</i>)	2
American badger (<i>Taxidea taxus</i>)	3	Canada porcupine (<i>Erethizon dorsatus</i>)	1
Common skunk (<i>Mephitis putida</i>)	4	Canada porcupine (<i>Erethizon dorsatus</i>)	1
American marten (<i>Mustela americana</i>)	4	albino	1
Fisher (<i>Mustela pennanti</i>)	1	Mexican agouti (<i>Dasyprocta mexicana</i>)	1
Mink (<i>Putorius vison</i>)	13	Asara's agouti (<i>Dasyprocta asara</i>)	2
Common ferret (<i>Putorius putorius</i>)	1	Crested agouti (<i>Dasyprocta cristata</i>)	2
Black-footed ferret (<i>Putorius nigripes</i>)	1	Hairy-rumped agouti (<i>Dasyprocta prym-nolopha</i>)	2
North American otter (<i>Lutra canadensis</i>)	2	Paca (<i>Oryzomys paca</i>)	3
Esquimo dog (<i>Canis familiaris</i>)	13	Guinea pig (<i>Cavia outleri</i>)	13
Dingo (<i>Canis dingo</i>)	1	Patagonian cavy (<i>Dolichotis patagonica</i>)	1
		Capybara (<i>Hydrochirus capybara</i>)	1
		Domestic rabbit (<i>Lepus cuniculus</i>)	15

¹ The causes of death were reported to be as follows: Enteritis, 23; gastritis, 2; gastroenteritis, 2; pneumonia, 15; pleuropneumonia, 1; congestion of lungs, 2; tuberculosis, 10; aspergillosis, 4; septicemia, 2; congestion of liver, 1; rupture of heart, 1; impaction of gall bladder and ducts, 1; impaction of stomach with stones, 1; tumor, 1; purulent conjunctivitis, 1; cataract, 1; congelation, 1; anemia due to old age, 2; accident, 3; and undetermined, 4.

Animals in the collection June 30, 1914—Continued.

MAMMALS—Continued.

Cape hyrax (<i>Procavia capensis</i>)	2	Prong-horn antelope (<i>Antilocapra americana</i>)	2
African elephant (<i>Elephas oxyotis</i>)	2	Coke's hartebeest (<i>Budalla cokei</i>)	1
Indian elephant (<i>Elephas maximus</i>)	1	Blessbok (<i>Damallacus albifrons</i>)	1
Brazilian tapir (<i>Tapirus americanus</i>)	4	White-tailed gnu (<i>Connochates gnu</i>)	1
Grevy's zebra (<i>Equus grevyi</i>)	2	Defassa water buck (<i>Cobus defassa</i>)	1
Zebra-horse hybrid (<i>Equus grevyi-caballus</i>)	1	Indian Antelope (<i>Antilope cervicapra</i>)	3
Zebra-donkey hybrid (<i>Equus grevyi-asinus</i>)	1	Dorcas gazelle (<i>Gazella dorcas</i>)	1
Grant's zebra (<i>Equus burchelli granti</i>)	1	Arabian gazelle (<i>Gazella arabica</i>)	4
Collared peccary (<i>Dicotyles angulatus</i>)	3	Sable antelope (<i>Hippotragus niger</i>)	1
Wild boar (<i>Sus scrofa</i>)	1	Nilgal (<i>Boselaphus tragocamelus</i>)	3
Northern wart hog (<i>Phacochærus africanus</i>)	2	Congo harness antelope (<i>Tragelaphus gratus</i>)	2
Hippopotamus (<i>Hippopotamus amphibius</i>)	2	Chamols (<i>Rupicapra tragus</i>)	3
Guanaco (<i>Lama huanachus</i>)	2	Tahr (<i>Hemitragus jemlatus</i>)	4
Llama (<i>Lama glama</i>)	7	Common goat (<i>Capra hircus</i>)	6
Alpaca (<i>Lama pacos</i>)	3	Angora goat (<i>Capra hircus</i>)	2
Vicugna (<i>Lama vicugna</i>)	2	Circassian goat (<i>Capra hircus</i>)	4
Bactrian camel (<i>Camelus bactrianus</i>)	2	Barbary sheep (<i>Ovis tragelaphus</i>)	12
Arabian camel (<i>Camelus dromedarius</i>)	3	Barbados sheep (<i>Ovis aries-tragelaphus</i>)	10
Sambar deer (<i>Cervus aristotellii</i>)	3	Anoa (<i>Anoa depressicornis</i>)	1
Philippine deer (<i>Cervus philippinus</i>)	1	Zebu (<i>Bibos indicus</i>)	3
Hog deer (<i>Cervus porcinus</i>)	7	Yak (<i>Posphagus grunniens</i>)	5
Barasingha deer (<i>Cervus duvaucelli</i>)	12	American bison (<i>Bison americanus</i>)	18
Axis deer (<i>Cervus axis</i>)	8	Hairy armadillo (<i>Dasypus villosus</i>)	3
Japanese deer (<i>Cervus sika</i>)	19	Wallaroo (<i>Macropus robustus</i>)	3
Red deer (<i>Cervus elaphus</i>)	7	Red kangaroo (<i>Macropus rufus</i>)	2
American elk (<i>Cervus canadensis</i>)	8	Red-necked wallaby (<i>Macropus ruficollis</i>)	1
Fallow deer (<i>Cervus dama</i>)	4	Virginia opossum (<i>Didelphys marsupialis</i>)	1
Virginia deer (<i>Odocoileus virginianus</i>)	11	Virginia opossum (<i>Didelphys marsupialis</i>) albino	1
Mule deer (<i>Odocoileus hemionus</i>)	1	Common wombat (<i>Phascolumys Mitchellii</i>)	1
Columbian black-tailed deer (<i>Odocoileus columbianus</i>)	1		
Cuban deer (<i>Odocoileus sp.</i>)	1		

BIRDS.

Catbird (<i>Dumetella carolinensis</i>)	2	Whydah weaver (<i>Vidua paradisæa</i>)	27
Brown thrasher (<i>Toxostoma rufum</i>)	1	Red-crested cardinal (<i>Paroaria cucullata</i>)	5
Japanese robin (<i>Liothia luteus</i>)	7	Rose-breasted grosbeak (<i>Zamelodia ludoviciana</i>)	1
Laughing thrush (<i>Garrulax leucophus</i>)	2	Common cardinal (<i>Cardinalis cardinalis</i>)	2
Bishop finch (<i>Tanagra episcopus</i>)	4	Siskin (<i>Spinus spinus</i>)	5
Cut-throat finch (<i>Amadina fasciata</i>)	8	Saffron finch (<i>Sycalis flaveola</i>)	19
Zebra finch (<i>Amadina castaneotis</i>)	4	Yellow-hammer (<i>Emberiza citrinella</i>)	1
Black-headed finch (<i>Munia atricapilla</i>)	6	Common canary (<i>Serinus canarius</i>)	26
Three-colored finch (<i>Munia malacca</i>)	6	Linnet (<i>Linota cannadina</i>)	4
White-headed finch (<i>Munia maja</i>)	9	Cowbird (<i>Molothrus ater</i>)	1
Nutmeg finch (<i>Munia punctularia</i>)	6	Meadow lark (<i>Sturnella magna</i>)	2
Java sparrow (<i>Munia oryzivora</i>)	13	Glossy starling (<i>Lamprolornis caudatus</i>)	1
White Java sparrow (<i>Munia oryzivora</i>)	12	Malabar mynah (<i>Polioptila malabaricus</i>)	2
Sharp-tailed grass finch (<i>Poephila acuticauda</i>)	1	European raven (<i>Corvus corax</i>)	1
Silver-bill finch (<i>Aidemosyne cantans</i>)	4	American raven (<i>Corvus corax sinuatus</i>)	2
Chestnut-breasted finch (<i>Donacola castaneothorax</i>)	6	Common crow (<i>Corvus brachyrhynchos</i>)	1
Napolean weaver (<i>Pyromelana afra</i>)	4	Green jay (<i>Xanthoura luzonæa</i>)	1
Madagascar weaver (<i>Foudia madagascariensis</i>)	4	White-throated jay (<i>Garrulus leucotis</i>)	2
Red-billed weaver (<i>Quelea quelea</i>)	8		

Animals in the collection June 30, 1914—Continued.

BIRDS—Continued.

Blue jay (<i>Cyanocitta cristata</i>)	3	Chilian eagle (<i>Geranoastur melano-</i>	
American magpie (<i>Pica pica hudsonica</i>)	3	leucus)	1
Red-billed magpie (<i>Urocissa occip-</i>		Crowned hawk eagle (<i>Spizaetus coron-</i>	
talis)	2	atus)	1
Piping crow (<i>Gymnorhina tibicen</i>)	1	Broad-winged hawk (<i>Buteo platyp-</i>	
Giant kingfisher (<i>Dacelo gigas</i>)	3	terus)	1
Sulphur-crested cockatoo (<i>Cacatua ga-</i>		Swainson's hawk (<i>Buteo swainsoni</i>)	1
lerita)	3	Venezuelan hawk	1
White cockatoo (<i>Cacatua alba</i>)	6	Caracara (<i>Polyborus cheriway</i>)	3
Leadbeater's cockatoo (<i>Cacatua lead-</i>		Lammergeyer (<i>Gypaetus barbatus</i>)	1
beateri)	1	South American condor (<i>Sarcorham-</i>	
Bare-eyed cockatoo (<i>Cacatua gym-</i>		phus gryphus)	1
nopsis)	4	California condor (<i>Gymnogyps califor-</i>	
Roseate cockatoo (<i>Cacatua roseica-</i>		nianus)	3
pilla)	12	Griffon vulture (<i>Gyps fulvus</i>)	2
Cockateel (<i>Calopittacus nova-hol-</i>		Cinereous vulture (<i>Vultur monachus</i>)	2
landiae)	2	Egyptian vulture (<i>Neophron percno-</i>	
Yellow and blue macaw (<i>Ara ara-</i>		terus)	1
rauna)	2	Turkey vulture (<i>Cathartes aura</i>)	4
Red and yellow and blue macaw (<i>Ara</i>		Black vulture (<i>Catharista urubi</i>)	2
macao)	6	King vulture (<i>Gypagus papa</i>)	2
Red and blue macaw (<i>Ara chloroptera</i>)	2	Red-billed pigeon (<i>Columba flaviro-</i>	
Great green macaw (<i>Ara militaris</i>)	1	tris)	4
Mexican conure (<i>Conurus holochlorus</i>)	1	White-crowned pigeon (<i>Columba leuco-</i>	
Gray-breasted parakeet (<i>Myopsittacus</i>		cephala)	2
monachus)	3	Band-tailed pigeon (<i>Columba fasciata</i>)	4
Cuban parrot (<i>Amazona leucocephala</i>)	3	Mourning dove (<i>Zenaidura macroura</i>)	7
Orange-winged amazon (<i>Amazona</i>		Peaceful dove (<i>Geopelia tranquilla</i>)	2
amazonica)	1	Collared turtle dove (<i>Turtur risorius</i>)	13
Festive amazon (<i>Amazona festiva</i>)	1	Cape masked dove (<i>Ena capensis</i>)	5
Porto Rican amazon (<i>Amazona vit-</i>		Nicobar pigeon (<i>Caloenas nicobarica</i>)	2
tata)	1	Barred curassow (<i>Cras fasciolata</i>)	1
Yellow-shouldered amazon (<i>Amazona</i>		Wild turkey (<i>Meleagris gallopavo sil-</i>	
ochroptera)	2	vestris)	8
Yellow-fronted amazon (<i>Amazona</i>		Peafowl (<i>Pavo cristata</i>)	80
ochrocephala)	2	Jungle fowl (<i>Gallus bankiva</i>)	1
Red-fronted amazon (<i>Amazona rhodo-</i>		English pheasant (<i>Phasianus colchi-</i>	
corytha)	1	cus)	1
Yellow-headed amazon (<i>Amazona le-</i>		European quail (<i>Coturnix communis</i>)	1
cavillanti)	2	Massena quail (<i>Cyrtonyx montezumae</i>)	4
Blue-fronted amazon (<i>Amazona</i>		Black-backed gallinule (<i>Porphyrio mela-</i>	
estiva)	2	notus)	1
Lesser vasa parrot (<i>Coracopsis nigra</i>)	2	American coot (<i>Fulica americana</i>)	5
Banded parakeet (<i>Palaeornis fasciata</i>)	1	Flightless rail (<i>Ocydromus australis</i>)	1
Alexandrine parakeet (<i>Palaeornis alex-</i>		Great bustard (<i>Otis tarda</i>)	1
andri)	2	Common carlama (<i>Carlama cristata</i>)	1
Love bird (<i>Agapornis pullaria</i>)	1	Demoiselle crane (<i>Anthropoides virgo</i>)	6
Green parakeet (<i>Loriculus sp.</i>)	2	Crowned crane (<i>Balearica pavonina</i>)	2
Shell parakeet (<i>Melopsittacus un-</i>		Whooping crane (<i>Grus americana</i>)	1
dulatus)	4	Sandhill crane (<i>Grus mexicana</i>)	2
Great horned owl (<i>Bubo virginianus</i>)	11	Australian crane (<i>Grus australasiana</i>)	1
Arctic horned owl (<i>Bubo virginianus</i>		European crane (<i>Grus cinerea</i>)	1
subarcticus)	1	Indian white crane (<i>Grus leucogeranus</i>)	2
Screech owl (<i>Otus asio</i>)	3	Ruff (<i>Melechetes pugnax</i>)	2
Barred owl (<i>Strix varia</i>)	2	Black-crowned night heron (<i>Nycticorax</i>	
Barn owl (<i>Aluco pratincola</i>)	1	nycticorax naevius)	8
Sparrow hawk (<i>Falco sparverius</i>)	1	Snowy egret (<i>Egretta candidissima</i>)	3
Bald eagle (<i>Haliaeetus leucocephalus</i>)	8	Great white heron (<i>Herodias egretta</i>)	1
Alaskan bald eagle (<i>Haliaeetus leucoce-</i>		Great blue heron (<i>Ardea herodias</i>)	3
phalus alascanus)	1	Great black-crowned heron (<i>Ardea co-</i>	
Golden eagle (<i>Aquila chrysaetos</i>)	4	coi)	1
Hairy eagle (<i>Thraustetus harpyia</i>)	1	Boat-bill (<i>Cancroma cochlearia</i>)	2

Animals in the collection June 30, 1914—Continued.

BIRDS—Continued.

Black stork (<i>Ciconia nigra</i>)-----	1	Mandarin duck (<i>Dendrocygna galei-</i>	
Marabou stork (<i>Leptoptilus dubius</i>)---	1	culata)-----	5
Wood ibis (<i>Mycteria americana</i>)-----	2	Pintail (<i>Dafila acuta</i>)-----	4
Sacred ibis (<i>Ibis aethiops</i>)-----	3	Shoveler duck (<i>Spatula clypeata</i>)-----	1
White ibis (<i>Guara alba</i>)-----	18	Black duck (<i>Anas rubripes</i>)-----	3
Roseate spoonbill (<i>Ajaja ajaja</i>)-----	2	Mallard (<i>Anas platyrhynchos</i>)-----	13
European flamingo (<i>Phaenicopterus ro-</i>		American white pelican (<i>Pelecanus</i>	
seus)-----	5	erythrorhynchos)-----	9
Whistling swan (<i>Olor columbianus</i>)---	5	European white pelican (<i>Pelecanus</i>	
Mute swan (<i>Cygnus gibbus</i>)-----	7	onocrotalus)-----	1
Black swan (<i>Chenopsis atrata</i>)-----	1	Roseate pelican (<i>Pelecanus roseus</i>)---	1
Muscovy duck (<i>Cairina moschata</i>)-----	2	Brown pelican (<i>Pelecanus occidentalis</i>)	5
White muscovy duck (<i>Cairina mos-</i>		Australian pelican (<i>Pelecanus con-</i>	
chata)-----	2	spicillatus)-----	2
Wandering tree-duck (<i>Dendrocygna</i>		Florida cormorant (<i>Phalacrocorax au-</i>	
arcuata)-----	6	ritus floridanus)-----	13
Fulvous tree-duck (<i>Dendrocygna bi-</i>		Mexican cormorant (<i>Phalacrocorax</i>	
color)-----	2	vigua mexicanus)-----	1
Brant (<i>Branta bernicla glaucogastra</i>)--	1	Water turkey (<i>Anhinga anhinga</i>)-----	2
Canada goose (<i>Branta canadensis</i>)---	7	American herring gull (<i>Larus argen-</i>	
Hutchins's goose (<i>Branta canadensis</i>		tatus smithsonianus)-----	3
hutchinsii)-----	3	Laughing gull (<i>Larus atricilla</i>)-----	2
Lesser snow goose (<i>Chen hyperboreus</i>)	1	South African ostrich (<i>Struthio aus-</i>	
Greater snow goose (<i>Chen hyperboreus</i>		tralis)-----	7
nivalis)-----	1	Somali ostrich (<i>Struthio molybdo-</i>	
American white-fronted goose (<i>Anser</i>		phanes)-----	1
albifrons gambeli)-----	1	Common cassowary (<i>Casuarus galea-</i>	
Chinese goose (<i>Anser cygnoides</i>)-----	3	tus)-----	1
Scaup duck (<i>Marila marila</i>)-----	5	Common rhea (<i>Rhea americana</i>)-----	2
Red-headed duck (<i>Marila americana</i>)---	2	Emu (<i>Dromæus nova hollandæ</i>)-----	2
Wood duck (<i>Aix sponsa</i>)-----	5		

REPTILES.

Alligator (<i>Alligator mississippiensis</i>)--	20	Spreading adder (<i>Heterodon platy-</i>	
Painted box-tortoise (<i>Cistudo ornata</i>)---	2	rhinus)-----	1
Duncan Island tortoise (<i>Testudo ephip-</i>		Black snake (<i>Zamenis constrictor</i>)---	1
pium)-----	2	Water snake (<i>Natrix sipedon</i>)-----	3
Afemarle Island tortoise (<i>Testudo</i>		Common garter snake (<i>Eutania sirtalis</i>)	1
vicina)-----	1	Water moccasin (<i>Ancistrodon pis-</i>	
Horned lizard (<i>Phrynosoma cornutum</i>)	1	civorus)-----	9
Gila monster (<i>Heloderma suspectum</i>)---	4	Copperhead (<i>Ancistrodon contortrix</i>)--	1
Regal python (<i>Python reticulatus</i>)---	4	Diamond rattlesnake (<i>Crotalus ada-</i>	
Common boa (<i>Boa constrictor</i>)-----	2	manatus)-----	4
Anaconda (<i>Eunectes murinus</i>)-----	1	Banded rattlesnake (<i>Crotalus horridus</i>)	1
Velvet snake (<i>Epicrates cenchris</i>)-----	3		

STATEMENT OF THE COLLECTION.

ACCESSIONS DURING THE YEAR.

Presented-----	59
Purchased-----	120
Born and hatched in the National Zoological Park-----	95
Received in exchange-----	17
Deposited in National Zoological Park-----	80
Captured in National Zoological Park-----	4
Total-----	325

SUMMARY.

Animals on hand July 1, 1913.....	1, 468
Accessions during the year.....	325
	1, 793
Deduct loss (by exchange, death, return of animals, etc.).....	431
On hand June 30, 1914.....	1, 362

Class.	Species.	Individuals.
Mammals.....	150	604
Birds.....	172	697
Reptiles.....	18	61
Total.....	340	1, 362

The number of animals on hand at the close of this year was about 100 less than the previous year. This decrease occurred mainly in small birds, conditions in the temporary bird house being so unsatisfactory that it seemed advisable to reduce somewhat that part of the collection. The floor of the bird house had to be renewed and the underpinning replaced and made rat proof.

Fewer reptiles, also, were on hand, as a part of the space previously used for them in the lion house was required for the new hippopotamus.

VISITORS.

The number of visitors to the park during the year, as determined by count and estimate, was 733,277, a daily average of 2,009. This was about 100,000 more than during the previous fiscal year. The largest number in any one month was 142,491, in April, 1914. The largest number during one day was 56,981, on April 13 (Easter Monday). Vehicles were excluded from 10 a. m. to 5 p. m. of that day because of the crowded condition of the roads.

Seventy-nine schools, classes, etc., visited the park, with a total of 3,172 individuals.

IMPROVEMENTS.

The amount remaining from the appropriation, after providing for maintenance and the acquisition of animals already mentioned, was used for such minor improvements as were most urgently needed. The fitting up of the old elephant barn as temporary quarters for the pair of African elephants was completed, and a good-sized yard built in connection with it, inclosed by a strong steel fence. The yard includes a bathing pool. The adjoining inclosure and pool for tapirs were completed and put in use early in the year.

New quarters for hippopotamus were arranged in the lion house by enlarging the cage formerly occupied by elephant seals. This

was already provided with a tank of sufficient size, and, by extending the exterior wall, ample floor space was secured. The female hippopotamus, which had outgrown her temporary quarters, was transferred to the new and much larger cage, and the cage vacated was used for a young male that had been obtained at an unusually favorable price. Both animals have access to the outdoor yard and the large pool which it contains. A new inclosure and shelter house for Arabian camels were built near the sheep and deer inclosures and two new yards were added to the series for wolves and foxes.

A yard 40 by 56 feet, with 10 breeding pens inclosed in it, was built to provide for the breeding and study of mink in cooperation with the Department of Agriculture.

During several years predatory animals living at large in the park had at times forced their way into the flying cage and caused considerable loss among the birds. In order to prevent this the guardrail about the cage was rebuilt, using between the posts a wire netting with small mesh and at the top a sheet-iron hood. This has proved to be effective against both rats and larger vermin.

A small temporary toilet for men was built near the entrance from Adams Mill Road.

A hot-water heating plant was installed in the office building, which had up to that time been heated, rather unsatisfactorily, with stoves. At the same time new floors were laid on the main floor of the office and some other much-needed repairs made. In order to provide for more convenient and economical use of the machines in the workshop, two additional electric motors were installed there.

The drinking fountains with attached cups were removed and seven "bubble" fountains set in their places. Several of these are fitted with faucets for the accommodation of visitors who bring cups or desire to obtain water for picnic purposes.

Two tennis courts were constructed in the lower end of the park where there is level ground that is not as yet available for other purposes.

The cost of these improvements was as follows:

Fitting up old elephant barn and building yard.....	\$1, 325
Completing yard and pool for tapirs.....	300
New quarters for hippopotamus.....	650
Inclosure and shelter house for Arabian camels.....	390
Additional yards for wolves.....	400
Quarters for breeding mink.....	325
New guard rail, with foundation wall, at flying cage.....	750
Small toilet house for men.....	200
Heating plant and new floors in office building.....	950
Additional motors in workshop.....	350
"Bubble" drinking fountains.....	200
Two tennis courts.....	150

MAINTENANCE OF BUILDINGS, INCLOSURES, GROUNDS, ETC.

Considerable repairs had to be made to some of the buildings and inclosures, including new roof covering on part of the lion house and the rebuilding of the fence around the elk paddock, and a portion of the retaining wall above the bear yards on the eastern side of the park was rebuilt where it had been undermined by the weathering of the rock below.

A severe storm on July 30, 1913, destroyed a number of large trees and caused serious damage throughout the park. The cost of removing the débris and restoring the park to its normal condition was about \$1,500.

BRIDGE.

The construction of the "rough stone or bowlder bridge" across Rock Creek, which was mentioned in the last annual report, proceeded in a satisfactory manner. The contract for the excavation and masonry work was secured by the lowest bidder, the Warren F. Brenizer Co. The plans and specifications were prepared by David E. McComb, engineer of bridges, District of Columbia, and it was thought best that the supervising engineer and the inspector of the work should be persons recommended by him. Mr. W. A. Draper was accordingly employed as engineer and Mr. William Champion as inspector. No obstacles of any importance were met with during the progress of the work, though it was found that the excavation required for the piers was somewhat greater than had been anticipated. The bridge was opened for travel on November 1, 1913. As there was a heavy fill of earth over the stone masonry, it was necessary to defer the construction of the macadam surface and concrete sidewalk until spring. This also was satisfactorily completed during June, 1914.

The following is a statement of the expenditures from the appropriation of \$20,000:

Expenditures prior to July 1, 1913 (all outside of contract for excavation and masonry).....	\$1, 776
Total payments under contract.....	10, 914
Expenditures during this fiscal year (outside of contract).....	5, 158
	<hr/> 18, 848

Since the close of the fiscal year expenditures and liabilities have been incurred, amounting to \$335, for restoring and perfecting the approaches to the bridge. The total expenditures to date are therefore \$18,183.

ALTERATION OF THE WEST BOUNDARY OF THE PARK.

The sundry civil act for the fiscal year ending June 30, 1914, contained the following item:

Readjustment of boundaries: For acquiring, by condemnation, all the lots, pieces, or parcels of land, other than the one hereinafter excepted, that lie

between the present western boundary of the National Zoological Park and Connecticut Avenue from Cathedral Avenue to Klinge Road, \$107,200, or such portion thereof as may be necessary, said land when acquired, together with the included highways, to be added to and become a part of the National Zoological Park. The proceedings for the condemnation of said land shall be instituted by the Secretary of the Treasury under and in accordance with the terms and provisions of subchapter 1 of chapter 15 of the Code of Law for the District of Columbia.

Under the sanction given by this act the attention of the Secretary of the Treasury was immediately called to the matter. A great delay has occurred. It is understood that a new survey of the property involved was necessary, that the searching of titles to the various parcels of land consumed considerable time. The case is now before the Supreme Court of the District of Columbia awaiting the award of a jury. In the meantime the principal property owner has endeavored to enhance the value of the land by grading and otherwise improving it. The total amount to be purchased is about 10½ acres.

ROCK CREEK MAIN INTERCEPTOR.

The District of Columbia having obtained from Congress authority to construct a large sewer, called the "Rock Creek main interceptor," extending from P Street northwest to the Military Road, District of Columbia, began work upon it within the limits of the park on June 1, 1913. The project involves both an open-cut sewer and a tunnel, about 2,000 feet in length, extending from a short distance below the new bridge to the Klinge Road. This construction necessarily produces a considerable disturbance of the surface and defacement of the natural features of the park. This is particularly the case at either end of the tunnel, where thousands of yards of excavated material have been dumped. It is hoped that the District officials will be able to remedy this in some measure when the work shall be completed. This is expected about September 5, 1914.

NEW APPROACH TO THE PARK.

By an act of Congress approved March 2, 1911, there was authorized a new approach to the park from Sixteenth Street and Columbia Road to what has been known as the Quarry Road entrance. This has now been completed by the District with a fine macadam roadway, and offers a most convenient and attractive route for reaching the park from the city. The Quarry Road, which had a very steep and dangerous gradient, has been abolished as a means of access.

IMPORTANT NEEDS.

Aviary.—Attention has been called for several years past to the importance of erecting a suitable house for the care and preserva-

tion of the birds of the collection, most of which are now housed in a low, wooden, temporary structure which is by no means suitable for the purpose and has to be constantly renewed by repairs. The matter has been repeatedly urged upon Congress and an appropriation of \$80,000 asked for a new structure. This is by no means an extravagant sum, as the aviaries of most zoological collections cost considerably more than this.

Reptile house.—The park has never had an adequate exhibition of the interesting and varied domain of reptiles. A few alligators, some Galapagos tortoises, boas, anacondas, and a few native species are kept in the lion house in quarters which are entirely unsuitable for their proper exhibition and comfort. It is thought that a proper reptile house, where the specimens could be kept in approximately natural conditions, could be built for about \$50,000.

Pachyderm house.—There are now in the collection a considerable number of pachydermata or thick-skinned animals, including an Indian elephant, two African elephants, two hippopotami, and four tapirs. These all require special treatment in the way of bathing pools, strong walls, etc. These animals are at present nearly all housed in quarters that are too small and weak. Some of them are young and rapidly growing and it will soon be a difficult matter to confine them. It is also likely that other species will be added to those now on hand. To properly exhibit and care for them a new house should be built. It is thought that this can be done at a cost of \$100,000, which is much less than similar structures have cost in other cities.

Hospital and laboratory.—The park has not at the present time any means for properly isolating and caring for the animals that may be injured or ailing. Sick animals are ordinarily exposed to the gaze of the public, to the detriment of the animals and the reputation of the park. Quiet and repose are as necessary to animals as to man, and that can not be assured under the present conditions.

Besides this, which seems required merely from humanitarian reasons, consideration should be given to certain scientific aspects of the matter. The diseases and parasites of animals are but imperfectly understood, and investigations of them are important, both directly and for their analogy with these of man and their possible transmission to the human race. The animals received at the park have usually been kept in unsanitary quarters and frequently bring in the germs of disease which they transmit to others. If a strict quarantine for a suitable time could be established this danger could be avoided in a great measure and the death rate reduced. Further than this there is now no adequate utilization of the animals for scientific purposes.

In other countries the most significant scientific function of collections of living animals has been the advancement of our knowledge with regard to the structure, habits, and activities of animals. Most of the knowledge which has been acquired with regard to the structure of animals has been gained from zoological collections of precisely similar character to those which we have in the National Zoological Park.

I may note, for example, that in the Jardin des Plantes, at Paris, investigations have been carried on since the middle of the eighteenth century by men who are among the most famous scientists that have ever lived. I will mention, among others, Duverney, Daubenton, Buffon, Cuvier, Geoffroy Saint-Hilaire, and Milne-Edwards. In the same way great names are associated with the Zoological Society of London. I may mention in this connection the names of Owen, Flower, Huxley, Selater, and the present prosector, Beddard. The garden at Berlin has been noted for the work of Hartmann, and in the garden at Amsterdam Fürbringer brought to a conclusion his monumental work upon the structure of birds. I mention a few names among many. It would be easy to extend the list very considerably.

In order to properly utilize the material that comes to the park from the death of the animals, it would be necessary to establish an anatomical and pathological laboratory. This would, of course, involve a considerable expenditure, but I am of the opinion that it would be a wise thing for the Smithsonian Institution to consider the question and to arrange to have the park advance along that line of growth. A proper structure for the purposes above mentioned suitably fitted with the necessary simple apparatus would probably cost \$15,000.

Lunch and rest house.—The visiting public is by no means properly served at present in the park, which is rather remote from restaurants or other places where food can be obtained, yet so extensive that a proper view of the collection occupies at least half a day. Very many visitors would be greatly benefited if there were a properly equipped lunch stand where food could be purchased at reasonable prices. This is so generally understood in other places that the lack of such facilities in the park is always a matter of surprise. There is at present only a very inadequate counter, kept on an exposed pavilion, which has to be closed up whenever the weather is inclement. Besides this, persons are not infrequently taken ill or become fatigued while at the park, and there should be means for meeting such emergencies. It is thought that a suitable structure for this purpose, containing the necessary cooking range, rest rooms, and water-closets, can be built for \$15,000.

Fill across valley, Ontario Road.—The administration has been considerably embarrassed by the great quantity of earth and débris that is washed down into the park from Ontario Road after every heavy rain. The Commissioners of the District were authorized to extend Adams Mill Road across a deep valley at the foot of Ontario Road, and this has made necessary a very heavy fill of loose earth that is readily excavated by rains. Attempts have been made to arrest this flow, which amounts to many tons of earth, but the means at the disposal of the park are inadequate.

Additions to the collection.—The park is greatly in need of certain well-known animals to make its exhibit more complete. I do not refer to those which are excessively rare, but to those that are common objects of interests to the public. The anthropoid apes, including the gorilla, the orang, the chimpanzee, and the gibbon, should be shown; also the rhinoceros, the East Indian tapir, the giraffe, the eland, the Beisa antelope, the koodoo, the East African buffalo, and a series of mountain goats and sheep, including those from the Western States.

Respectfully submitted.

FRANK BAKER, *Superintendent.*

Dr. CHARLES D. WALCOTT,

Secretary the Smithsonian Institution, Washington, D. C.

APPENDIX 5.

REPORT ON THE ASTROPHYSICAL OBSERVATORY.

SIR: I have the honor to present the following report on the operations of the Smithsonian Astrophysical Observatory for the year ending June 30, 1914:

EQUIPMENT.

The equipment of the Observatory is as follows:

(a) At Washington there is an inclosure of about 16,000 square feet, containing five small frame buildings used for observing and computing purposes, three movable frame shelters covering several out-of-door pieces of apparatus, and also one small brick building containing a storage battery and electrical distribution apparatus.

(b) At Mount Wilson, Cal., upon a leased plot of ground 100 feet square, in horizontal projection, are located a one-story cement observing structure, designed especially for solar-constant measurements, and also a little frame cottage, 21 feet by 25 feet, for observer's quarters.

Upon the observing shelter at Mount Wilson there is a tower 40 feet high above the 12-foot piers which had been prepared in the original construction of the building. This tower has been equipped with an improvised tower telescope for use when observing (with the spectrolometer) the distribution of radiation over the sun's disk.

Other pieces of apparatus for research have been purchased or constructed at the Observatory shop. The value of these additions to the instrumental equipment, not counting the tower above mentioned and its equipment, is estimated at \$1,500.

WORK OF THE OBSERVATORY.

AT WASHINGTON.

Observations.—Mr. Fowle has continued the difficult research on the transmission through moist air of radiations of great wave length, such, for instance, as those which bodies at the temperature of the earth emit most freely. He uses a very powerful lamp made up of a large number of Nernst electric glowers, and examines by the aid of the spectrolometer the energy spectrum of the rays

emitted by this lamp, first directly, and then, after the rays have traversed twice or four times a tube 200 feet long, containing air of measured humidity. During the past year Mr. Fowle has been dealing principally with rays of the very longest wave lengths of the terrestrial energy spectrum which moist air transmits. He has reached a wave length of about eighteen microns, which is about twenty-five times the longest wave length visible to the eye, and about three and one-half times the wave length of the solar rays investigated by this observatory in the years 1890 and 1900.

A great number of difficulties are met with. In the first place, great sensitiveness of the bolometer is required, owing to the feebleness of these rays. Attempts to use a vacuum bolometer have consumed much time, but not yet with entire success. Full success in this seems now probable. In the second place there is great difficulty in determining the amount of radiation lost in the optical train required to reflect the beam to and fro through the long tube. A principal difficulty in this matter arises from the fact that the lamp and its surroundings are unequally hot at different parts, for this has led to different degrees of loss at different wave lengths. This last source of error is so obscure that it escaped our attention for a long time and has required the observations to be repeated after results worthy of publication had, as it was thought, been reached. These and a host of other difficulties have delayed the research, but great hope is now felt that satisfactory results will be ready for publication in another year.

Computations.—The reductions of Mount Wilson and Washington observations take a large part of the time of Mr. Fowle and Mr. Aldrich, as well as the entire time of Miss Graves and a portion of that of Mr. Carrington. This work is nearly up to date.

Mr. Fowle has continued the study of the effect of terrestrial water vapor on the Mount Wilson solar observations and has published several valuable papers upon it. An interesting result is, that after determining and correcting for the effect of atmospheric water vapor on the transmission of solar rays the coefficients of atmospheric transparency determined at Mount Wilson when combined with the barometric pressure after the manner indicated by Lord Rayleigh's theory of gaseous scattering of light, yield the value 2.70 billion billion as the number of molecules at standard pressure and temperature in a cubic centimeter of gas. Prof. Millikan, by a wholly independent kind of reasoning, has derived from electrical experiments the value 2.705 billion billion. The close agreement found is a strong confirmation of the accuracy of our determinations of atmospheric transparency, and accordingly tends to increase confidence in our determination of the solar constant of radiation.

PREPARATION OF APPARATUS.

Sky radiation instruments.—The director and Mr. Aldrich have devoted much time to the design and testing of apparatus for measuring the scattered radiation of the sky by day. What is desired is an instrument exposing horizontally an absorber of radiation in such a manner that the rays of the entire visible hemisphere of the sky would be received upon it, all rays not of solar origin would be excluded by a suitable screen, and the total energy of the scattered sky radiation originally emitted by the sun would be measured accurately. This is a more difficult problem than the measurement of the direct solar radiation, and it is unlikely that quite as high precision can be attained with the sky radiation instrument as with the pyrhelimeters used for measuring direct solar radiation. From experiments with several instruments of the kind which have been constructed in the observatory shop by Mr. Kramer and tested by Messrs. Abbot and Aldrich it now seems probable that the sources of error can be so far eliminated that sky radiation measurements accurate to about 2 per cent will be made. An instrument embodying what are thought to be the final improvements of design is now under construction, and it is hoped it will be used a great deal in the coming year.

Balloon pyrhelimeters.—Still more time has been devoted by Messrs. Abbot, Aldrich, and Kramer to the reconstruction and testing of balloon pyrhelimeters. Mention was made in last year's report of the proposed measurements of solar radiation by apparatus attached to sounding balloons and raised to great elevations. As stated below, the first trials in August, 1913, while unexpectedly successful in many ways, did not enable us to obtain measurements above the elevation of about 14,000 meters, or 45,000 feet. At this elevation the mercury froze in the thermometers. Also, the clock-work proved not sufficiently accurate for best results. Still the results obtained were so promising that it was thought well to repeat the experiments.

Accordingly the five balloon pyrhelimeters were reconstructed. Excellent French clocks were substituted for those used in 1913, and many improvements of the instruments were introduced. Two devices were employed to prevent the freezing of the mercury in the thermometer. In some instruments water jackets, having numerous interior copper bars to act as heat conductors, were arranged. In these it was hoped to make available the latent heat of freezing of the water and thus to prevent the surroundings of the pyrhelimetric apparatus from descending far below the freezing point of water. In other instruments electrical temperature regulators were provided. Many experiments were tried to obtain a constant, powerful, and

very light electric battery for this purpose. At length a modification of the Roberts cell was designed, in which individual cells weighing 20 grams ($\frac{3}{4}$ ounce) would furnish a constant potential of 1.3 volts and yield a nearly constant current of about 0.5 ampere for nearly two hours. The internal resistance of the cells was only about 0.3 ohms. Barometric elements were made to record on the same drum that recorded radiation. One instrument was constructed to be sent up at night, so as to show if any unexpected phenomena occurred when the instruments were being raised, apart from those due to the sun. Many tests of the instruments were made at different temperatures and pressures, and while immersed in descending air currents comparable to those anticipated to attend the flights. The accompanying illustration shows one of the balloon pyrhelimeters as reconstructed.

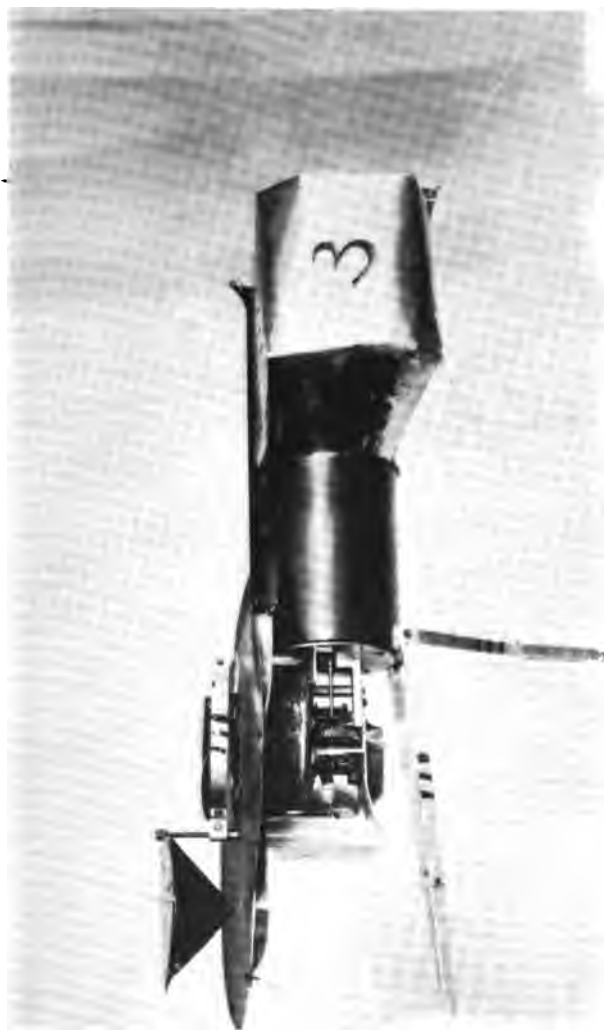
Silver-disk pyrhelimeters.—As in former years, a number of silver-disk pyrhelimeters were standardized at the Observatory and sent out by the Institution to several foreign Government observatories.

IN THE FIELD.

MOUNT WILSON EXPEDITION OF 1913.

Mr. Aldrich went to Mount Wilson early in July, 1913, and carried on there solar constant measurements until September when he was joined and then relieved by Mr. Abbot, who continued the observations until November. An expedition at the charge of the private funds of the Smithsonian, and under the direction of Mr. A. K. Ångström, was in California during July and August for the purpose of measuring nocturnal radiation at different altitudes, ranging from below sea level to the summit of Mount Whitney, 4,420 meters (14,502 feet). Mr. Aldrich cooperated as far as possible with this expedition.

Balloon pyrhelimetry.—At the same time a cooperating expedition from the United States Weather Bureau made ascents of captive and free balloons in order to determine the temperature, pressure, and humidity at great elevations, for use in reducing Mr. Ångström's observations. Advantage was taken of the opportunity to send up special pyrhelimeters for measuring solar radiation at great altitudes. These experiments, which were made jointly by Mr. Aldrich and Mr. Sherry of the Weather Bureau, were referred to by anticipation in last year's report. Five balloon pyrhelimeters were sent up from Santa Catalina Island. All were recovered, with readable records. One instrument unfortunately lay in a field about six weeks before recovery, and parts of its record referring to the higher elevations were obliterated, but it yielded the best results of any up to about 8,000 meters. Two of the instruments unfortunately were



BALLOON PYRHELIOMETER.

shaded by cirrus clouds until after the mercury froze in their thermometers. The highest elevation at which a radiation record was obtained was about 14,000 meters, or nearly 45,000 feet. As stated in last year's report no results indicating that values of solar radiation exceeding our solar constant value (1.93 calories) are obtainable by pyrheliometric measurements at any elevation, however high, appear from these balloon pyrheliometer experiments. In view of the proposed repetition of the experiments with improved apparatus no further statement of these preliminary results is necessary here.

The tower-telescope work.—As stated in former reports, investigations were carried on at Washington during the years 1904 to 1907 to determine the distribution of the sun's radiation along the diameter of the solar disk. It was shown by this work, in accord with results of earlier observers, that the edge of the solar disk is much less bright than the center, and that this contrast of brightness is very great for violet and ultra-violet rays, but diminishes steadily with increasing wave lengths, and becomes very slight for red and especially for infra-red rays. These phenomena are well shown in

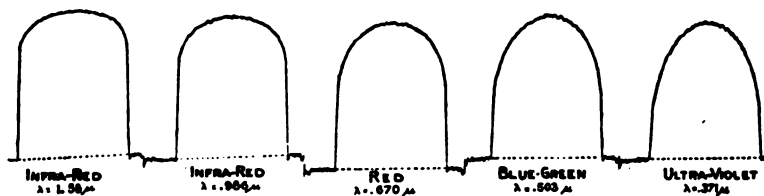


FIG. 1.—Brightness distribution along sun's diameter for different colors.

the accompanying illustration, from observations of 1913. The measurements were continued at Washington on all suitable days in the hope that some fluctuation of this contrast of brightness between the edge and center of the solar disk would be disclosed. It seemed probable that there might be such fluctuations associated with the irregular variability of the total solar radiation. It proved, however, that such fluctuations, if existing, were of so small an order of magnitude that it was not certain whether they were really shown by the observations at Washington, hampered as these were by variable transparency of the air.

When the observing station was erected on Mount Wilson in 1908 provision was made for a tower telescope designed to continue this research. When in 1911 and 1912 the Algerian expeditions confirmed the sun's variability, added interest was felt in the proposed experiments. Accordingly, the tower, 50 feet in height, was completed in 1912. Not sufficient funds were available to equip the tower telescope, but Director Hale, of the Mount Wilson Solar Observatory, kindly loaned considerable apparatus, and with this and some appa-

ratus which remained from eclipse expeditions, and by using anything available, as, for instance, a trunk of a tree for a mirror support at the top of the tower, Messrs. Abbot and Aldrich succeeded in getting arranged on the tower a reflecting telescope of 12 inches aperture and 75 feet focus, all ready for observations by September 9, 1913. Then and thereafter solar constant measurements were supplemented by determinations of the distribution of radiation along the sun's diameter on each day of observation. These determinations are made in seven different wave lengths on each day, ranging from 0.38μ in the ultra violet to 1.1μ in the infra-red. Fortunately, the definition of the tower telescope proves to be very good. There is slight change of focus during the several hours of observing, and the "seeing" seems not to deteriorate much up to 10 o'clock a. m., at which time the observations are generally concluded.

About 45 days of simultaneous observations of the "solar constant" and of the distribution of radiation over the sun's disk were secured in 1913. The results appear to indicate a variability in both phenomena and a distinct correlation of the two in point of time. It is indicated that when in course of its short-period irregular variation the solar radiation increases, there occurs simultaneously a diminution of the contrast between the edge and center of the sun's disk. A change of brightness of about 1.5 per cent was found to occur at 95 per cent out on the solar radius accompanying a change of 6 per cent in the solar radiation. On comparing the mean of all results obtained in 1913 with the mean of all obtained in Washington in 1906-7, it appears that there was distinctly less contrast of brightness between the edge and center of the sun's disk in 1913 than in 1907. We have reason, however, to believe that there was distinctly a greater total solar radiation in 1907 than in 1913. This result, compared with the result stated above, indicates a difference of character between the long-period fluctuations of the sun and its short-period irregular fluctuations. The changes of contrast found, however, agree in this, that whether from day to day in 1913, or as between 1913 and 1907, the violet or shorter wave lengths change in contrast more than the red or longer wave lengths.

MOUNT WILSON EXPEDITION OF 1914.

Mr. Abbot continued the Mount Wilson work, beginning in May, 1914. Many improvements were made in the tower telescope, leading to improved definition and stability of the image of the sun. Improved methods of observing were introduced also.

BALLOON PYRHELIOMETRY.

Mr. Aldrich, in cooperation with the United States Weather Bureau observers, under personal direction of Dr. Blair, arranged to

repeat the balloon pyrheliometer observations, and this time at Omaha. Ascensions were not made until after July 1, 1914, but it may be said in anticipation that two ascensions by day and one by night were made. All three instruments were recovered. No unexpected phenomena were disclosed by the night record. One day record appears to be excellent. Fortunately the instrument which recorded it came back uninjured, and further tests and calibrations with it are intended. The instrument reached a very great height, and recorded radiation successfully until after it began to descend. Preliminary reductions show that the values recorded fall below our adopted value of the solar constant of radiation.

SUMMARY.

Progress has been made in the measurement of the effects produced by atmospheric water vapor on solar and terrestrial radiation. New apparatus for measuring sky radiation has been devised and perfected. Special pyrheliometers have been constructed and caused to record solar radiation with considerable success at great altitudes when attached to free balloons. The results obtained tend to confirm the adopted value of the solar constant of radiation. Further results from balloon pyrheliometry are expected. A tower telescope has been erected and put in operation on Mount Wilson. By means of it the variability of the sun has been independently confirmed, for it appears that changes of the distribution of radiation over the sun's disk occur in correlation with the changes of the sun's total radiation.

Respectfully submitted.

C. G. ABBOT,

Director Astrophysical Observatory.

Dr. CHARLES D. WALCOTT,

Secretary of the Smithsonian Institution.

APPENDIX 6.

REPORT ON THE LIBRARY.

SIR: I have the honor to present the following report upon the work of the Library of the Smithsonian Institution and its branches during the fiscal year ending June 30, 1914:

It is with deep regret that the library records the death, on June 25, 1914, of Dr. Frederick William True, assistant secretary of the Smithsonian Institution in charge of library and exchanges.

ACCESSIONS.

The additions to the library are received, with few exceptions, in exchange for the publications of the Institution or by gift. There were received during the year a total of 32,964 packages of publications, about 90 per cent of which came by mail and the balance through the International Exchange Service. The correspondence incident thereto aggregated about 2,000 written letters and 5,883 printed forms of acknowledgment.

There was catalogued, accessioned, and forwarded to the Smithsonian Deposit in the Library of Congress a total of 32,195 pieces, as follows: 3,765 volumes and 1,729 parts of volumes, 5,755 pamphlets, 20,603 periodicals, and 343 charts. In addition 1,062 parts of serials were received to complete imperfect sets. The accession entries were from 513,027 to 517,776.

There was also transferred to the Library of Congress without being stamped and recorded a total of 7,464 public documents presented to the Institution.

The accessions to the office library, the Astrophysical Observatory, and the National Zoological Park amounted to 1,165 publications, which were distributed as follows: 631 volumes, 93 parts of volumes, 46 pamphlets, and 1 chart were recorded for the office library; 106 volumes, 33 parts of volumes, and 212 pamphlets for that of the Astrophysical Observatory; and 39 volumes and 4 pamphlets for the National Zoological Park. This large increase over the previous year was due in part to the addition of nearly 100 books for the employees' library from the estate of Miss Lucy Hunter Baird and also to books acquired for the use of the Langley Aerodynamical Laboratory.

Complete sets of inaugural dissertations and technological publications from 35 universities and technical high schools were received from the following places: Baltimore, Basel, Berlin, Bern, Bonn, Braunschweig, Breslau, Dresden, Erlangen, Freiburg, Giessen, Greifswald, Halle-Wittenberg, Hamburg, Heidelberg, Helsingfors, Ithaca, Jena, Karlsruhe, Kiel, Königsberg, Leipzig, Louvain, Lund, Marburg, New Haven, Paris, Rostock, St. Petersburg, Strassburg, Toulouse, Tübingen, Upsala, Würzburg, and Zurich.

EXCHANGES.

A considerable portion of the periodicals in the Smithsonian Library are obtained in exchange for publications of the Institution. During the year 138 new titles of periodicals were thus added to the large series of scientific journals already contained in the Smithsonian deposit. There were also secured 1,062 parts to complete imperfect sets of publications already in the library.

This work of completing the sets and series in the Smithsonian deposit is of great importance and has been carried forward with definite results.

In response to requests sent to various institutions, 832 missing parts have been supplied to complete 124 sets of publications of scientific institutions and learned societies, 151 parts of 62 periodicals and 78 parts of 30 sets and 1 map for the series in the general classification. Among the more important publications received and sent to the deposit to complete the sets may be mentioned 73 parts of the "Chetniia," of the University of Moscow, Russia, making the set complete from 1869 to date; also 60 parts of the *Boletín de la Sociedad Mexicana de Geografía y Estadística*, of Mexico City, Mexico, completing the set to date; and 4 sets of publications, comprising 78 volumes, from *Het Islenska Bokmentafelag*, of Reykjavik, Iceland, completing the sets from 1869 to date.

The securing of publications of historical societies in the United States and abroad has been continued, and many additional publications have been obtained and transmitted to the Library of Congress.

READING ROOM.

The reading room has been in constant use during the year. There are now on file about 270 foreign and domestic scientific periodicals which are required by the staff of the institution and its branches for consultation. In view of the fact that this collection contains representative scientific periodicals from all parts of the world, officers of the scientific bureaus of the various governmental establishments in Washington and students generally continue to take advantage of the opportunity to consult them.

THE AERONAUTICAL LIBRARY.

With the inauguration of the Langley Aerodynamical Laboratory many important works on aeronautics published in the last few years were needed in connection with the work. A specially prepared list made by Dr. A. F. Zahm and Naval Constructor Jerome C. Hunsaker, United States Navy, was considered, and 120 publications not already on the shelves were secured.

ART ROOM.

The collections of works on art have remained practically unchanged during the year. The administration of the National Gallery of Art being now under the National Museum, all books relating to the fine arts formerly assigned to the art room are now placed in the museum library as received.

EMPLOYEES' LIBRARY.

The employees' library has been very fortunate in receiving, through the estate of Miss Lucy Hunter Baird, volumes in addition to those presented by her some years ago, which add interest to the collection of general literature for the use of the employees.

NEW STEEL BOOK STACKS.

In the report on the library for last year the preliminary plans for the new steel book stacks for the main hall of the Smithsonian building were discussed. On March 14, 1914, a contract was entered into for the erection of the stacks in the east end and the completion of the work within 120 days from that date. On February 26, 1914, the wrecking of the galleries had begun with the moving of the books of the Bureau of American Ethnology library, and within 10 days the old galleries had been razed and the old exhibition cases removed, leaving the east end of the hall entirely free. At the end of the year the floor and walls at the east end of the hall had been repaired, the heating plant reinstalled, and the steel framework of the stacks put in place.

These stacks are of steel construction, in three tiers, one on the main floor and two above, the two above having floors of glass. On the east wall is a single-faced stack covering the entire wall area from the floor of the hall to the ceiling. At the two columns second from the east end is erected a double-faced stack, partitioning the stacks from the main hall, and on the west face of this stack are two galleries which are an extension of the floors of the stacks. The stacks between this partition and the east wall have open shelving throughout. A passageway on the lower floor leading to the offices of the Institution in the east end of the building has been provided

for, and the openings between the stacks on the sides provided with grill doors in order that the books on these shelves may be protected. The cases on the north and south walls of what is left of the main hall, as well as those under the first gallery, are provided with glass-panel doors in order to protect the contents, as it is the intention to use this hall for museum exhibition purposes.

CATALOGUE OF SMITHSONIAN PUBLICATIONS.

The manuscript of the dictionary catalogue of the publications of the Institution and its branches mentioned in last year's report is still in preparation, but it is expected that it will be ready for publication during the coming year.

UNITED STATES NATIONAL MUSEUM.

The library of the National Museum consists of the main library in the natural history building, to which have been transferred all the publications relating to biology and anthropology as well as those of a general character; the technological series, in the older, or arts and industries building, which at present includes publications relating to technology, and for convenience those on history and botany. These two libraries do not include, however, some 30 sectional libraries in the scientific departments and divisions of the Museum. In making this arrangement the convenience and interests of the scientific staff have been the only consideration. The entire library of the Museum now contains 43,609 volumes, 73,765 pamphlets and unbound papers, and 124 manuscripts. The accessions during the past year were 1,917 volumes, 1,723 pamphlets, and 132 parts of volumes.

In the library of the Museum 755 books were catalogued; 2,001 pamphlets; total number of cards made, 3,520; completed volumes of periodicals catalogued, 1,162; parts of publications, 12,833; parts of periodicals entered, 397; 397 new periodical cards were made, and 8 books and 362 pamphlets were recatalogued.

The number of books, periodicals, and pamphlets borrowed from the general library was 20,884, which includes 9,718 obtained from the Library of Congress, 376 from the Department of Agriculture, 105 from the United States Geological Survey, 90 from the Army Medical Museum and Library, 2 from the United States Bureau of Education, 4 from the United States Patent Office, 4 from the Bureau of Fisheries, 1 from the United States Weather Bureau, 3 from the United States Naval Observatory, and 2 from Harvard University, Cambridge, Mass.

The securing of new exchanges for the Museum has been continued, with the result that many new publications have been added to the

catalogue, and much has been done toward securing, in connection with this work, parts of publications.

The moving of the biological, anthropological, and general reference series of the library to the new building having been completed in the previous year and the rearrangement of the publications on the shelves taken up, attention was given to the finishing of this latter task.

DUPLICATE MATERIAL.

For many years the Museum library was overcrowded to such an extent that the shelves had overflowed and it was impossible to have a proper arrangement of the books. With these publications were many duplicates which had been received by gift and otherwise from the very beginning.

Among the duplicate material were many volumes of United States Government documents duplicating publications already on the shelves, and these, being of no further use to the Institution, were transferred to the superintendent of documents, in accordance with law.

BINDING.

The lack of sufficient funds for the binding of publications is a serious question. This will obstruct the work in the future more than in the past, unless an adequate sum can be set aside, so that all the volumes may be bound and made ready for reference. To prepare a volume for binding and then to be obliged to take out parts of it urgently needed by the staff makes it incomplete, and should that part be lost the volume may remain incomplete, inasmuch as the publications which the Museum needs for its work are published in limited editions and it is often impossible again to secure them for binding when there is money available for the purpose.

During the year 690 volumes were prepared for binding and sent to the Government bindery for that purpose.

GIFTS.

Many important gifts were received by the library during the year, the estate of Miss Lucy Hunter Baird being one of the donors. The following members of the staff presented publications: Dr. William Healey Dall, Dr. O. P. Hay, Dr. C. W. Richmond, Dr. Edgar A. Mearns, Mr. Alfred Klakring, and Dr. Harriet Richardson Searle.

BAIRD LIBRARY.

Spencer Fullerton Baird, second secretary of the Smithsonian Institution, gave his valuable scientific library to the United States National Museum when the Museum library was founded. He re-

tained during his lifetime a number of volumes, and after his death his daughter, Miss Lucy Hunter Baird, continued to add to these books. In her will, which was probated after her death last year, she left to the Museum this collection, which numbered 750 volumes.

DALL LIBRARY.

A number of books relating to mollusks was presented to the Museum in 1892 by Dr. William Healey Dall, and he has added to this gift from year to year. The number of titles is now about 7,500, and these, with a comparatively small number of books from other sources, make up the sectional library of the division of mollusks. During the past year Dr. Dall has added about 50 titles. The cataloguing of these books was completed during the past year under Dr. Dall's personal direction.

TECHNOLOGICAL SERIES.

Periodicals entered on the records of the technology library have numbered 476 complete volumes, 6,096 parts of volumes, and the new periodical cards made for these have been 331. The cataloguing for the year numbered 256 volumes and 747 pamphlets, requiring 1,187 separate cards. The total number of cards typewritten, periodical and catalogue, is 1,518. In addition, about 500 volumes and 8,000 pamphlets have been placed on the shelves under their respective class numbers and will be incorporated later in the records which are now in preparation.

Books and pamphlets loaned during the year in addition to those from the general library numbered 188 volumes and 290 single pamphlets and parts of periodicals, making a total number of 478 publications. About 360 books have been consulted in the reading room, and about 3,000 books and periodicals have been transferred to the various sections of mineral technology, textiles, and graphic arts, and section cards made for these.

The science depository set of cards from the Library of Congress was received last year, and about 28,000 have been filed alphabetically. About the same number remain to be filed before the set is in alphabetical order. When completed it will be a useful index to the scientific resources of Washington. The catalogue has been completed for all the books in the reading room and about two-thirds of the east gallery, leaving the north gallery and the remainder of the east gallery still to be done.

SECTIONAL LIBRARIES.

The sectional libraries of the Museum have been receiving reference publications for which receipts have been given and filed in

the library, but since the moving to the new building no systematic checking has been done of what is now on the shelves in the libraries placed in the departments and divisions. It seems desirable and important that this matter should receive consideration, and it is recommended that a competent cataloguer be employed to do this special work. It is estimated that it would require a year's time to complete the work.

The sectional libraries now existing are as follows:

Administration.	Marine invertebrates.
Administrative assistant's office.	Materia medica.
Anthropology.	Mechanical technology.
Biology.	Mollusks.
Birds.	Oriental archeology.
Botany.	Paleobotany.
Comparative anatomy.	Parasites.
Editor's office.	Photography.
Ethnology.	Physical anthropology.
Fishes.	Prehistoric archeology.
Geology.	Reptiles and batrachians.
Graphic arts.	Superintendent's office.
History.	Taxidermy.
Insects.	Textiles.
Invertebrate paleontology.	Vertebrate paleontology.
Mammals.	

BUREAU OF AMERICAN ETHNOLOGY.

This library is administered under the direct care of the ethnologist in charge, and a report on its operations will be found in the general report of the bureau.

ASTROPHYSICAL OBSERVATORY.

Books relating directly to astrophysics have been brought together for the use of the Observatory. It is a valuable series of technical works and all the publications are in constant use. During the year 351 publications have been added, consisting of 106 volumes, 33 parts of volumes, and 212 pamphlets. There were 64 volumes bound at the Government Printing Office.

NATIONAL ZOOLOGICAL PARK.

The collection of works on zoological subjects, which are kept in the office of the superintendent of the park, is not very large, but they all relate to the work which is being carried on. During the year 39 volumes and 4 pamphlets have been added.

SUMMARY OF ACCESSIONS.

The following statement summarizes the accessions during the year, with the exception of the library of the Bureau of American Ethnology:

To the Smithsonian deposit in the Library of Congress, including parts to complete sets.....	12,654
To the Smithsonian office, Astrophysical Observatory, and Zoological Park	1,165
To the United States National Museum.....	3,772
Total	17,591

Respectfully submitted.

PAUL BROCKETT,
Assistant Librarian.

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 7.

REPORT ON THE INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

SIR: I have the honor to submit the following report on the operations of the United States Bureau of the International Catalogue of Scientific Literature for the year ending June 30, 1914:

This enterprise was organized in 1901 and has for its object the preparation and publication of an annual classified index to the current literature of science. The catalogue is published in the form of a classified book index, each paper referred to being first listed under the author's name and again under the subject or subjects of the contents. Seventeen main volumes are issued each year, one for each of the following-named branches of science: Mathematics, mechanics, physics, chemistry, astronomy, meteorology, mineralogy, geology, geography, paleontology, general biology, botany, zoology, anatomy, anthropology, physiology, and bacteriology.

All of the first 9 annual issues have been published, together with 16 volumes of the tenth issue, 8 volumes of the eleventh issue, and 1 volume of the twelfth, a total of 178 regular volumes, in addition to several special volumes of schedules, lists of journals, etc. The number of pages in each annual issue is shown in the following table:

	Pages.
First annual issue.....	7, 763
Second annual issue.....	8, 826
Third annual issue.....	8, 493
Fourth annual issue.....	8, 681
Fifth annual issue.....	10, 785
Sixth annual issue.....	10, 049
Seventh annual issue.....	9, 219
Eighth annual issue.....	8, 609
Ninth annual issue.....	7, 933
Tenth annual issue.....	8, 447

The large increase in size of the fifth and sixth annual issues necessitated a change in the plan of publication, the object in view being to reduce the bulk and consequent cost of the work while not reducing its usefulness. This has been accomplished by printing the full titles and references only once—that is, in the author catalogue—the subject catalogue containing only the author's name and

a number referring to a like number in the author's catalogue where the full reference may be found. Following this plan has resulted in a marked reduction in the size of the eighth, ninth, and tenth issues.

The central bureau of the organization is maintained in London and has charge of receiving, editing, and publishing the classified references furnished by the 33 regional bureaus cooperating in the production of the catalogue. These regional bureaus are maintained for the most part by direct governmental grants made by the countries in which they are situated. The annual subscription price for a complete set of 17 volumes is \$85. The proceeds derived from subscriptions are used entirely to support the central bureau.

During the year 28,606 cards were sent from this bureau to the London central bureau, as follows:

Literature of—

1905.....	169
1906.....	64
1907.....	133
1908.....	621
1909.....	223
1910.....	852
1911.....	2,988
1912.....	8,010
1913.....	15,546

Total..... 28,606

The following table shows the number of cards sent each year as well as the number of cards representing the literature of each year from 1901 to 1913, inclusive:

Literature of—	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913	Total for year.
Year ending June 30—														
1902.....	6,990													6,990
1903.....	6,150	8,330												14,480
1904.....	3,044	9,424	8,745											21,213
1905.....	1,619	2,780	11,143	8,640										24,182
1906.....	301	622	3,538	12,139	9,001									25,601
1907.....	384	511	862	5,272	9,022	12,578								28,629
1908.....	408	523	366	956	5,629	7,217	13,429							28,528
1909.....	133	235	373	309	1,656	4,410	8,509	18,784						34,409
1910.....	72	173	248	465	1,163	1,502	3,160	6,305	11,994					25,062
1911.....	3	26	28	218	129	374	423	1,301	8,836	14,682				26,020
1912.....			4	243	386	562	1,480	1,949	3,372	5,231	13,974			27,201
1913.....			9	5	12	14	131	226	324	685	3,214	6,950	16,425	27,995
1914.....						169	64	133	621	223	852	2,988	8,010	15,546
Total ..	19,104	22,633	25,312	28,254	27,169	26,838	27,360	29,284	25,110	23,979	23,912	24,435	15,546	318,936

As has been pointed out in several previous annual reports, this enterprise is in no sense commercial, and should be freed from the necessity of depending entirely on subscription for its maintenance. A comparatively small endowment would materially aid in improving the form and expanding the scope of the index to include some of the applied sciences. Could this be done, it is more than probable that increased demands would more than make up for increased expense, for when the catalogue meets the demands of the applied sciences, as it now does those of pure science, it will become a general work of reference for all branches of arts and industries. The organization is complete and satisfactory, and its usefulness could be greatly increased by the expenditure of a comparatively small sum annually.

No advance or improvement can, however, be undertaken until an assured additional income becomes available.

The International Catalogue was originally organized by a number of international conferences, the third of which met in London in July, 1900. The delegates there assembled provided that an international convention should meet in London in 1905, in 1910, and every tenth year thereafter to reconsider and revise, if necessary, the regulations governing the enterprise.

It was provided also that an international council should meet in London at least once every three years to regulate the affairs of the catalogue between two successive meetings of the convention. A meeting of this international council was held June 11 and 12, 1914, and after authorizing the necessary contracts for the continuation of the enterprise and disposing of a number of other routine matters, discussed the very vital question of altering and revising the classification schedules. It was provided that further alteration would best be made by the introduction of subdivisions to the now existing schedules, such subdivisions to be suggested by the regional bureaus as the need for them should appear.

Very respectfully, yours,

LEONARD C. GUNNELL,
Assistant in Charge.

DR. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.

APPENDIX 8.

REPORT ON THE PUBLICATIONS.

SIR: I have the honor to submit the following report on the publications of the Smithsonian Institution and its branches during the year ending June 30, 1914:

The Institution proper published during the year 36 papers in the series of "Smithsonian Miscellaneous Collections," an annual report, and pamphlet copies of 38 papers from the general appendix of the report. The Bureau of American Ethnology published 2 bulletins and a separate paper, and the United States National Museum issued 2 annual reports, 49 miscellaneous papers from the proceedings, 9 new bulletins and parts, and 9 parts of volumes pertaining to the National Herbarium.

The total number of copies of publications distributed by the Institution proper during the year was 107,471. The aggregate includes 1,229 volumes of Smithsonian Contributions to Knowledge; 59,777 volumes and separates of Smithsonian Miscellaneous Collections; 23,279 volumes and separates of the Smithsonian annual reports; 6,463 special publications; 1,477 copies of volume 3, *Annals of the Astrophysical Observatory*; 775 reports of the Harriman Alaska Expedition; 12,819 volumes and separates of the Bureau of American Ethnology publications; 1,412 annual reports of the American Historical Association; 26 publications of the United States National Museum; and 194 publications not of the Smithsonian Institution or its branches. Additional copies of the third edition of the Smithsonian Geographical Tables were printed just before the close of the year. There were also distributed by the National Museum 93,200 copies of its several publications, making a total of 202,671 publications distributed by the Institution and its branches during the year.

SMITHSONIAN CONTRIBUTIONS TO KNOWLEDGE.

QUARTO.

No publications of this series were issued during the year.

SMITHSONIAN MISCELLANEOUS COLLECTIONS.

OCTAVO.

Of the Miscellaneous Collections, volume 57, 3 papers were published; of volume 59, 1 paper, and title-page and table of contents;

of volume 60, 2 papers, and title-page and table of contents; of volume 61, 21 papers, and title-page and table of contents; of volume 62, 2 papers; of volume 63, 6 papers; and of volume 64, 1 paper; in all, 36 papers, as follows:

Volume 57.

- No. 11. Cambrian geology and paleontology. II. New Lower Cambrian subfauna. By Charles D. Walcott. Published July 21, 1913. Pp. 309-326, pls. 50-54. (Publ. 2185.)
- No. 12. Cambrian geology and paleontology. II. Cambrian formations of the Robson Peak district, British Columbia and Alberta, Canada. By Charles D. Walcott. July 24, 1913. Pp. 327-343, pls. 55-59. (Publ. 2186.)
- No. 13. Cambrian geology and paleontology. II. Dikelocephalus and other genera of the Dikelocephalinae. By Charles D. Walcott. April 4, 1914. Pp. 345-412 and index, pls. 60-70. (Publ. 2187.)
- [Title-pages and table of contents.] (Publ. 2270.) In press.

Volume 59.

- No. 19. Early Norse Visits to North America. By William H. Babcock. July 9, 1913. iii+213 pp., 10 pls.
- Title-page and table of contents. vi pp. August 7, 1913. (Publ. 2234.)

Volume 60.

- No. 23. The influence of the atmosphere on our health and comfort in confined and crowded places. By Leonard Hill, Martin Flack, James McIntosh, R. A. Rowlands, and H. B. Walker. Hodgkins Fund. July 15, 1913. 96 pp. (Publ. 2170.)
- No. 30. Explorations and field work of the Smithsonian Institution in 1912. March 28, 1913. 76 pp., 82 figs. (End of volume.) (Publ. 2178.)
- Title-pages and table of contents. August 7, 1913. vi pp. (Publ. 2235.)

Volume 61.

- No. 1. The White Rhinoceros. By Edmund Heller. October 11, 1913. 77 pp., 31 pls. (Publ. 2180.) [Nos. 2 to 5 of this volume were published during previous year.]
- No. 6. Great stone monuments in history and geography. By J. Walter Fewkes. September 15, 1913. 50 pp. (Publ. 2229.)
- No. 7. New races of antelopes from British East Africa. By Edmund Heller. July 31, 1913. 13 pp. (Publ. 2231.)
- No. 8. The comparative histology of the femur. By Dr. J. S. Foote. August 22, 1913. 9 pp., 3 pls. (Publ. 2232.)
- No. 9. Descriptions of three new African weaver birds of the genera Estrilda and Granatina. By Edgar A. Mearns. July 31, 1913. 4 pp. (Publ. 2236.)
- No. 10. Descriptions of four new African thrushes of the genera Planesticus and Geocichla. By Edgar A. Mearns. August 11, 1913. 5 pp. (Publ. 2237.)
- No. 11. Descriptions of six new African birds. By Edgar A. Mearns. August 30, 1913. 5 pp. (Publ. 2238.)
- No. 12. Populus Macdougalii. A new tree from the Southwest. By J. N. Rose. September 3, 1913. 2 pp., 1 pl. (Publ. 2239.)
- No. 13. New antelopes and carnivores from British East Africa. By Edmund Heller. September 16, 1913. 15 pp. (Publ. 2240.)

- No. 14. Descriptions of five new African weaver birds of the genera *Othypantes*, *Hypargos*, *Aldemosyne*, and *Lagonostica*. By Edgar A. Mearns. September 29, 1913. 5 pp. (Publ. 2241.)
- No. 15. Notes on the recent crinoids in the British Museum. By Austin Hobart Clark. December 31, 1913. 89 pp. (Publ. 2242.)
- No. 16. A new shrub of the genus *Esenbeckia* from Colombia. By Dr. K. Krause. September 29, 1913. 1 p. (Publ. 2243.)
- No. 17. New races of ungulates and primates from Equatorial Africa. By Edmund Heller. October 21, 1913. 12 pp. (Publ. 2245.)
- No. 18. Anthropological work in Peru in 1913, with notes on the pathology of the ancient Peruvians. By Dr. Aleš Hrdlička. February 12, 1914. 69 pp., 26 pls. (Publ. 2246.)
- No. 19. New races of carnivora and baboons from Equatorial Africa and Abyssinia. By Edmund Heller. November 8, 1913. 12 pp. (Publ. 2248.)
- No. 20. Descriptions of 10 new African birds of the genera *Pogonochla*, *Cossypha*, *Bradypterus*, *Sylvietta*, *Melaniparus*, and *Zosterops*. By Edgar A. Mearns. November 29, 1913. 8 pp. (Publ. 2251.)
- No. 21. Fifty-one new Malayan mammals. By Gerrit S. Miller, jr. December 29, 1913. 30 pp. (Publ. 2252.)
- No. 22. Four new subspecies of large mammals from Equatorial Africa. By Edmund Heller. January 26, 1914. 7 pp. (Publ. 2255.)
- No. 23. A new genus of Mallophaga from African guinea fowl in the United States National Museum. By John Howard Palne. January 31, 1914. 4 pp. (Publ. 2258.)
- No. 24. New Sapindaceæ from Panama and Costa Rica. By Prof. Dr. L. Radlkofer. February 9, 1914. 8 pp. (Publ. 2259.)
- No. 25. Descriptions of eight new African Bulbuls. By Edgar A. Mearns. February 18, 1914. 6 pp. (Publ. 2260.)
- Title-pages and table of contents. March 13, 1914. vi pp. (Publ. 2265.)

Volume 62.

- No. 1. Advisory Committee on the Langley Aerodynamical Laboratory. Hodgkins Fund. July 17, 1913. 5 pp. (Publ. 2227.)
- No. 2. Hydromechanic experiments with flying-boat hulls. By H. C. Richardson. Hodgkins Fund. April 20, 1914. 9 pp., 6 pls. (Publ. 2253.)
- No. 3. Report on European aeronautical laboratories. By A. F. Zahm. 23 pp., 11 pls. (Publ. 2273.) In press.

Volume 63.

- No. 1. Atmospheric air in relation to tuberculosis. By Guy Hinsdale. Hodgkins Fund. June 22, 1914. 136 pp., 93 pls. (Publ. 2254.)
- No. 2. Notes on some specimens of a species of Onychophore (*Oroperipatus corradoi*) new to the fauna of Panama. By Austin Hobart Clark. February 21, 1914. 2 pp. (Publ. 2261.)
- No. 3. A new Ceratopsian dinosaur from the Upper Cretaceous of Montana, with note on *Hypacrosaurus*. By Charles W. Gilmore. March 21, 1914. 10 pp., 2 pls. (Publ. 2262.)
- No. 4. On the relationship of the genus *Aulacocarpus*, with description of a new Panamanian species. By H. Pittier. March 18, 1914. 4 pp. (Publ. 2264.)
- No. 5. Descriptions of five new mammals from Panama. By E. A. Goldman. March 14, 1914. 7 pp. (Publ. 2266.)

- No. 6. Physical Tables. Sixth edition. F. E. Fowle. (Publ. 2269.) In press.
 No. 7. New subspecies of mammals from Equatorial Africa. By Edmund Heller. June 24, 1914. 12 pp. (Publ. 2272.)

Volume 64.

- No. 1. Cambrian geology and paleontology. III. The Cambrian Faunas of Eastern Asia. By Charles D. Walcott. April 22, 1914. Pp. 1-76, pls. 1-3. (Publ. 2263.)
 No. 2. Cambrian geology and paleontology. III. Pre-Cambrian Algonkian Algal Flora. By Charles D. Walcott. Pp. 77-156, pls. 4-23. (Publ. 2271.) In press.

SMITHSONIAN ANNUAL REPORTS.

Report for 1912.

The Annual Report of the Board of Regents for 1912 was received from the Public Printer in completed form in October, 1913.

Annual Report of the Board of Regents of the Smithsonian Institution, showing operations, expenditures, and condition of the Institution for the year ending June 30, 1912. xii, 780 pp., 72 pls. (Publ. 2188.)

Small editions of the following papers, forming the general appendix of the annual report for 1912, were issued in pamphlet form:

- The year's progress in astronomy. By P. Pulseux. 8 pp. (Publ. 2189.)
 The spiral nebulae. By P. Pulseux. 10 pp. (Publ. 2190.)
 The radiation of the sun. By C. G. Abbot. 13 pp., 4 pls. (Publ. 2191.)
 Molecular theories and mathematics. By Émile Borel. 20 pp. (Publ. 2192.)
 Modern mathematical research. By G. A. Miller. 12 pp. (Publ. 2193.)
 The connection between the ether and matter. By Henri Poincaré. 12 pp. (Publ. 2194.)
 Experiments with soap bubbles. By C. V. Boys. 8 pp., 1 pl. (Publ. 2195.)
 Measurements of infinitesimal quantities of substances. By William Ramsay. 11 pp. (Publ. 2196.)
 The latest achievements and problems of the chemical industry. By Carl Duisberg. 26 pp. (Publ. 2197.)
 Holes in the air. By W. J. Humphreys. 12 pp., 2 pls. (Publ. 2198.)
 Review of applied mechanics. By L. Lecornu. 16 pp. (Publ. 2199.)
 Report on the recent great eruption of the volcano "Stromboli." By Frank A. Perret. 5 pp., 9 pls. (Publ. 2200.)
 The glacial and postglacial lakes of the Great Lakes region. By Frank B. Taylor. 37 pp. (Publ. 2201.)
 Applied geology. By Alfred H. Brooks. 24 pp. (Publ. 2202.)
 The relations of paleobotany to geology. By F. H. Knowlton. 6 pp. (Publ. 2203.)
 Geophysical research. By Arthur L. Day. 11 pp. (Publ. 2204.)
 A trip to Madagascar, the country of beryls. By A. Lacroix. 12 pp. (Publ. 2205.)
 The fluctuating climate of North America. By Ellsworth Huntington. 30 pp., 10 pls. (Publ. 2206.)
 The survival of organs and the "culture" of living tissues. By R. Legendre. 8 pp., 4 pls. (Publ. 2207.)
 Adaptation and inheritance in the light of modern experimental investigation. By Paul Kammerer. 21 pp., 8 pls. (Publ. 2208.)

- The paleogeographical relations of antarctica. By Charles Hedley. 11 pp. (Publ. 2209.)
- The ants and their guests. By P. E. Wasmann. 20 pp., 10 pls. (Publ. 2210.)
- The penguins of the antarctic regions. By L. Gain. 8 pp., 9 pls. (Publ. 2211.)
- The derivation of the European domestic animals. By C. Keller. 9 pp. (Publ. 2212.)
- Life: its nature, origin, and maintenance. By E. A. Schäfer. 33 pp. (Publ. - 2213.)
- The origin of life: a chemist's fantasy. By H. E. Armstrong. 15 pp. (Publ. 2214.)
- The appearance of life on worlds and the hypothesis of Arrhénius. By Alphonse Berget. 9 pp. (Publ. 2215.)
- The evolution of man. By G. Elliot Smith. 20 pp. (Publ. 2216.)
- The history and varieties of human speech. By Edward Sapir. 23 pp. (Publ. 2217.)
- Ancient Greece and its slave population. By S. Zaborowski. 12 pp. (Publ. 2218.)
- Origin and evolution of the blond Europeans. By Adolphe Bloch. 22 pp. (Publ. 2219.)
- History of the finger-print system. By Berthold Laufer. 22 pp., 7 pls. (Publ. 2220.)
- Urbanism: A historic, geographic, and economic study. By Pierre Clerget. 15 pp. (Publ. 2221.)
- The Sinai problem. By E. Oberhummer. 9 pp., 3 pls. (Publ. 2222.)
- The music of primitive peoples and the beginnings of European music. By Willy Pastor. 22 pp. (Publ. 2223.)
- Expedition to the South Pole. By Roald Amundsen. 16 pp. (Publ. 2224.)
- Icebergs and their location in navigation. By Howard T. Barnes. 24 pp., 3 pls. (Publ. 2225.)
- Henri Poincaré, his scientific work, his philosophy. By Charles Nordmann. 23 pp. (Publ. 2226.)

Report for 1913.

The report of the executive committee and proceedings of the Board of Regents of the Institution, as well as the report of the Secretary for the fiscal year ending June 30, 1913, both forming part of the annual report of the Board of Regents to Congress, were published in pamphlet form in November and December, respectively, 1913, as follows:

- Report of the executive committee and proceedings of the Board of Regents for the year ending June 30, 1913. 21 pp. (Publ. 2250.)
- Report of the Secretary of the Smithsonian Institution for the year ending June 30, 1913. Ill, 119 pp., 1 pl. (Publ. 2249.)

The general appendix to the Smithsonian Report for 1913 was in type, but actual presswork was not completed at the close of the fiscal year. In the general appendix are the following papers:

- The earth and sun as magnets, by George E. Hale.
- The reaction of the planets upon the sun, by P. Pulseux.
- Recent progress in astrophysics, by C. G. Abbot.
- The earth's magnetism, by L. A. Bauer.

- Modern ideas on the end of the world, by Gustav Jaumann.
Recent developments in electromagnetism, by Eugene Bloch.
Wireless transmission of energy, by Elihu Thomson.
Oil films on water and on mercury, by Henri Devaux.
Water and volcanic activity, by Arthur L. Day and E. S. Shepherd.
Ripple marks, by Ch. Epry.
Notes on the geological history of the walnuts and hickories, by Edward W. Berry.
The formation of leafmold, by Frederick V. Coville.
The development of orchid cultivation and its bearing upon evolutionary theories, by J. Costantin.
The manufacture of nitrates from the atmosphere, by Ernest Kilburn Scott.
The geologic history of China and its influence upon the Chinese people, by Elliot Blackwelder.
The problems of heredity, by E. Apert.
Habits of fiddler-crabs, by A. S. Pearse.
The abalones of California, by Charles L. Edwards.
The value of birds to man, by James Buckland.
Experiments in feeding hummingbirds during seven summers, by Althea R. Sherman.
What the American Bird Banding Association has accomplished during 1912, by Howard H. Cleaves.
The whale fisheries of the world, by Charles Rabot.
The most ancient skeletal remains of man, by Aleš Hrdlička.
The redistribution of mankind, by H. N. Dickson.
The earliest forms of human habitation, and their relation to the general development of civilization, by M. Hoernes.
Feudalism in Persia; its origin, development, and present condition, by Jacques de Morgaa.
Shintoism and its significance, by K. Kanokogi.
The Minoan and Mycenaean element in Hellenic life, by A. J. Evans.
Flameless combustion, by Carleton Ellis.
Problems in smoke, fume, and dust abatement, by F. G. Cottrell.
Twenty years' progress in marine construction, by Alexander Gracie.
Creating a subterranean river and supplying a metropolis with mountain water, by J. Bernard Walker and A. Russell Bond.
The application of the physiology of color vision in modern art, by Henry G. Keller and J. J. R. Macleod.
Fundamentals of housing reform, by James Ford.
The economic and social rôle of fashion, by Pierre Clerget.
The work of J. van't Hoff, by G. Brunl.

SPECIAL PUBLICATIONS.

The following publications were issued in octavo form:

Publication lists.

- Classified list of Smithsonian publications available for distribution April 25, 1914. Published April 25, 1914. vi+32 pp. (Publ. 2268.)
Publications of the Smithsonian Institution issued between January 1 and June 30, 1913. July 15, 1913. 2 pp. (Publ. 2228.)
Publications of the Smithsonian Institution issued between January 1 and September 30, 1913. October 14, 1913. 4 pp. (Publ. 2244.)
Publications of the Smithsonian Institution issued between January 1 and December 31, 1913. January 22, 1914. 4 pp. (Publ. 2257.)

Publications issued by the Smithsonian Institution between January 1 and March 31, 1914. April 10, 1914. 1 p. (Publ. 2267.)

Opinions rendered by the International Commission on Zoological Nomenclature, Opinions 57-65. March 26, 1914. Pp. 131-169. (Publ. 2256.)

An account of the exercises on the occasion of the presentation of the Langley Medal and the unveiling of the Langley Memorial Tablet, May 6, 1913, including the addresses. October 13, 1913. 26 pp., 4 pls. (Publ. 2233.)

Harriman Alaska series.

Vol. 14. Monograph of shallow-water starfishes of the north Pacific coast from the Arctic Ocean to California. Part I, text; part II, plates. By Addison Emery Verrill. April 30, 1914. xii+408 pp., 110 pls. (Publ. 2140.)

PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM.

The publications of the National Museum are: (a) The annual report to Congress; (b) the proceedings of the United States National Museum; and (c) the bulletin of the United States National Museum, which includes the contributions from the United States National Herbarium. The editorship of these publications is vested in Dr. Marcus Benjamin.

The publications issued by the National Museum during the year comprised 49 papers of the proceedings, 2 annual reports, 9 bulletins and parts, and 9 parts of Contributions from the National Herbarium.

The issues of the proceedings were as follows: Vol. 45, papers 1976, 1985, 2005, 2006, and 2007; vol. 46, papers 2008 to 2042, inclusive; vol. 47, papers 2043 to 2051, inclusive; Annual Report of the United States National Museum for 1912; and Annual Report of the United States National Museum for 1913.

The bulletins were as follows:

Bulletin 50, part 6, Birds of North and Middle America. By Robert Ridgway.
Bulletin 71, part 3, A monograph of the Foraminifera of the North Pacific Ocean, Part III, Lagenidæ. By Joseph Augustine Cushman.

Bulletin 71, part 4, A monograph of the Foraminifera of the North Pacific Ocean, Part IV, Chilostomellidæ, Globigerinidæ, Nummulitidæ. By Joseph Augustine Cushman.

Bulletin 80. A descriptive account of the building recently erected for the departments of natural history of the United States National Museum. By Richard Rathbun.

Bulletin 83. Type species of the genera of Ichneumon flies. By Henry L. Viereck.

Bulletin 84. A contribution to the study of Ophiurans of the United States National Museum. By Rene Koehler.

Bulletin 85. A monograph of the jumping plant lice or Psyllidæ of the New World. By David L. Crawford.

Bulletin 86. A monograph of the genus Chordelles Swainson, type of a new family of goatsuckers. By Harry C. Oberholser.

Bulletin 87. Culture of the ancient pueblos of the upper Gila River region, New Mexico and Arizona. By Walter Hough.

In the series of Contributions from the National Herbarium there appeared:

Volume 16.

- Part 10. *Annona sericea* and its allies. By William E. Safford.
 Part 11. Nomenclature of the Sapote and the Sapodilla. By O. F. Cook.
 Part 12. A monograph of the Hauyæ and Gongylocarpæ, tribes of the Onagraceæ. By J. Donald Smith and J. N. Rose.
 Part 13. *Botrychium virginianum* and its forms *Sphenoclea zeylanica* and *Caperonia palustris* in the southern United States. By Ivar Tidestrom.

Volume 17.

- Part 3. Mexican grasses in the United States National Herbarium. By A. S. Hitchcock.
 Part 4. Studies of tropical American ferns. By William R. Maxon.
 Part 5. Studies of tropical American Phanerogams—No. 1. By Paul C. Standley.

Volume 18.

- Part 1. Classification of the genus *Annona* with descriptions of new and imperfectly known species. By W. E. Safford.
 Part 2. New or noteworthy plants from Colombia and Central America—4. By Henry Pittier

There was also reprinted an edition of 200 copies each of parts A, K, and P of Bulletin 39, United States National Museum, directions for collecting birds, by Robert Ridgway, directions for collecting and preparing fossils, by Charles Schuchert, directions for collectors of American basketry, by Otis T. Mason; an edition of 500 copies of Bulletin 67, directions for collecting and preserving insects, by Nathan Banks; an edition of 2,000 copies of list of publications issued by the United States National Museum from 1906 to 1912, reprinted from annual reports with altered pagination; and an edition of 1,300 copies of a list of publications of the United States National Museum issued during the fiscal year 1912-13, reprinted from the annual report with altered pagination.

PUBLICATIONS OF THE BUREAU OF AMERICAN ETHNOLOGY.

The publications of the bureau are discussed in Appendix 2 of the Secretary's report. The editorial work is in the charge of Mr. J. G. Gurley, who has been assisted from time to time by Mrs. Frances S. Nichols.

Two bulletins and a "separate" from another bulletin were issued during the year, as follows:

- Bulletin 53. Chippewa music—II. By Frances Densmore.
 Bulletin 56. Ethnzoology of the Tewa Indians. By Junius Henderson and John P. Harrington.
 Coos: An illustrative sketch. By Leo J. Frachtenberg. Extract from Handbook of American Indian Languages (Bulletin 40), part 2.

At the close of the year two annual reports and several bulletins were in press.

PUBLICATIONS OF THE SMITHSONIAN ASTROPHYSICAL OBSERVATORY

Volume III, *Annals of the Smithsonian Astrophysical Observatory*, by C. G. Abbot, F. E. Fowle, and L. B. Aldrich. July 16, 1913, xi+241 pp., 7 pls. (Publ. 2230.)

PUBLICATIONS OF THE AMERICAN HISTORICAL ASSOCIATION.

The annual reports of the American Historical Association are transmitted by the association to the Secretary of the Smithsonian Institution, and are communicated to Congress under the provisions of the act of incorporation of the association.

Volumes 1 and 2 of the annual report for 1911 were published November 10, 1913, and January 14, 1914, respectively, with contents as follows:

Volume I.

Report of the proceedings of the twenty-seventh annual meeting of the American Historical Association. By Waldo G. Leland, secretary.

Report of the proceedings of the eighth annual meeting of the Pacific coast branch. By H. W. Edwards, secretary of the branch.

The archives of the Venetian Republic. By Theodore F. Jones.

Materials for the history of Germany in the sixteenth and seventeenth centuries. By Sidney B. Fay.

The materials for the study of the English cabinet in the eighteenth century. By Edward Raymond Turner.

François de Guise and the taking of Calais. By Paul van Dyke.

Factions in the English privy council under Elizabeth. By Conyers Read.

Anglo-Dutch relations, 1671-72. By Edwin W. Pahlow.

American-Japanese intercourse prior to the advent of Perry. By Inazo Nitobe.

Colonial society in America. By Bernard Moses.

French diplomacy and American politics, 1794-95. By James Alton James.

The insurgents of 1811. By D. R. Anderson.

The tariff and the public lands from 1828 to 1833. By Raynor G. Wellington.

The "Bargain of 1844" as the origin of the Wilmot proviso. By Clark E. Persinger.

Monroe and the early Mexican revolutionary agents. By Isaac Joslin Cox.

Public opinion in Texas preceding the Revolution. By Eugene C. Barker.

Relations of America with Spanish America, 1720-1744. By H. W. V. Temperley.

The genesis of the Confederation of Canada. By Cephas D. Allin.

Proceedings of the eighth annual conference of historical societies.

List of European historical societies.

Twelfth report of the public archives commission. By Herman V. Ames, chairman.

Appendix A. Proceedings of the third annual conference of archivists.

Appendix B. Report on the archives of the State of Colorado. By James F. Willard.

Appendix C. List of commissions and instructions to governors and lieutenant governors of American and West Indian Colonies, 1609-1784.

Writings on American history, 1911. By Grace G. Griffin.

Volume II.

Ninth report of the historical manuscripts commission: Correspondence of Alexander Stephens, Howell Cobb, and Robert Toombs.

The report for 1912 was sent to the printer on January 31, 1914, and at the close of the year was nearly ready for distribution. The contents are as follows:

Report of the proceedings of the twenty-eighth annual meeting of the American Historical Association.

Report of the proceedings of the ninth annual meeting of the Pacific coast branch. By H. W. Edwards, secretary of the branch.

Royal finances of the reign of Henry III. By Henry L. Cannon.

Antecedents of the Quattrocento. By Henry O. Taylor.

The new Columbus. By Henry P. Biggar.

The charter of Connecticut. By Clarence W. Bowen.

The enforcement of the alien and sedition acts. By Frank M. Anderson.

The reviewing of historical books. By Carl Becker.

Briefer papers read in conferences:

A. Libya as a field of research. By Oric Bates.

B. The international character of commercial history. By Abbott P. Usher.

C. Some new manuscript sources for the history of modern commerce. By N. S. B. Gras.

D. The study of South American commercial history. By Charles L. Chandler.

E. On the economics of slavery, 1815-1860. By Ulrich B. Phillips.

F. On the history of Pennsylvania, 1815-1860. By P. Orman Ray.

G. Historical research in the far west. By Katherine Coman.

Proceedings of the conference on military history.

Proceedings of the ninth annual conference of historical societies:

Genealogy and history. By Charles K. Bolton.

The Massachusetts Historical Society. By Worthington C. Ford.

Appendix: Reports of historical societies, 1912.

Thirteenth report of the Public Archives Commission:

Appendix A. Proceedings of the fourth annual conference of archivists.

Plan and scope of a "Manual of Archival Economy for the use of American Archivists," By Victor H. Paltsits.

Some fundamental principles in relation to archives. By Waldo G. Leland.

The adaptation of archives to public use. By Dunbar Rowland.

Appendix B. Report on the archives of the State of Louisiana. By Prof. William O. Scroggs.

Appendix C. Report on the archives of the State of Montana. By Paul C. Phillips.

Classified list of publications of the American Historical Association, 1885-1912.

Tenth report of the historical manuscripts commission:

Letters of William Vans Murray to John Quincy Adams, 1797-1803. Edited by Worthington C. Ford.

PUBLICATIONS OF THE SOCIETY OF THE DAUGHTERS OF THE AMERICAN REVOLUTION.

The manuscript of the Sixteenth Annual Report of the National Society of the Daughters of the American Revolution for the year ending October 11, 1913, was communicated to Congress June 16, 1914.

THE SMITHSONIAN ADVISORY COMMITTEE ON PRINTING AND PUBLICATION.

The editor has continued to serve as secretary of the Smithsonian advisory committee on printing and publication. To this committee have been referred the manuscripts proposed for publication by the various branches of the Institution, as well as those offered for printing in the Smithsonian publications. The committee also considered forms of routine, blanks, and various matters pertaining to printing and publication, including the qualities of paper suitable for text and plates. Twenty meetings were held and 121 manuscripts were acted upon.

Respectfully submitted.

A. HOWARD CLARK, *Editor.*

Dr. CHARLES D. WALCOTT,
Secretary of the Smithsonian Institution.



